Groundwater
& Environmental Services, Inc.

410 Eagleview Boulevard • Suite 110 • Exton, Pennsylvania 19341 • (610) 458-1077 • FAX (610) 458-2300

29 April 1998

Ms. Maureen Essenthier, Project Manager
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
841 Chestnut Building
Philadelphia, PA 19107-4431

Mail Code 3HW80

Re: Quebecor Printing Atglen Inc. 4581 Lower Valley Road, Atglen, PA
Docket No. RCRA-3-014TH
Corrective Measures Initiation Plans

Dear Ms. Essenthier:

Attached for your review, please find copies of the following reports for the above-referenced site:

- One original and one copy of the CMI 50% Design Report
- One original and one copy of the CMI Sampling and Analysis Plan
- One original and one copy of the CMI Project Management Plan
- One original of the site Health & Safety Plan

Please contact either of the undersigned, or Diane Potts at Quebecor [(610) 593-1419], should you have questions or comments on this material.

Sincerely,

Groundwater & Environmental Services, Inc.

Mark A. Sweitzer, P.G.
Project Manger/Hydrogeologist

Kenneth J.K. Smith, L.S.P.
Principle Hydrogeologist/
Site Operations Manager

cc: Ms. Diane E. Potts, Quebecor
Ms. Mary Gay Sprague, Arnold & Porter (w/out attachments)

RECEIVED BY JOANNE HIGHSMITH - RECEPTIONIST - 4:00 PM 4/29/98

RCRA CORRECTIVE MEASURES INITIATION

**PROJECT MANAGEMENT/
COMMUNITY RELATIONS PLAN**

QUEBECOR PRINTING ATGLEN INC.

RCRA CONSENT ORDER NO RCRA-3-014 TH

DRAFT REPORT FOR USEPA REVIEW

Revised 2/4/99

Prepared for:
Quebecor Printing Atglen Inc.
4581 Lower Valley Road
Atglen, PA 19310-0465

Prepared by:
Groundwater &
Environmental Services, Inc.
410 Eagleview Boulevard
Suite 110
Exton, PA 19341
(610) 458-1077

4/29/98

Submitted to:

U.S. EPA Region III
841 Chestnut Building
Philadelphia, PA 19107

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TABLES

CERTIFICATION

RCRA CORRECTIVE MEASURES INITIATION

QUEBECOR PRINTING ATGLEN INC.

I certify that the information contained in or accompanying this Corrective Measures Implementation Project Management Plan is true, accurate, and complete.

As to those identified portions of this Corrective Measures Implementation Project Management Plan for which I cannot personally verify their accuracy, I certify under penalty of law that this and all attachments were prepared in accordance with procedures designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person directly responsible for gathering the information, or the immediate supervisor of such persons, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibilities of fines an imprisonment for knowing violations.

Date: 4/29/98 By: ______________________

Steve Eggleston
Vice President and General Manager
Quebecor Printing Atglen Inc.

1.0 OVERALL MANAGEMENT STRATEGY AND RESPONSIBILITIES OF PERSONNEL

The Quebecor Corrective Measures Initiation (CMI) project team personnel are described below with their respective responsibilities, as an organizational guide. All project participants understand their respective roles, internal interactions, and proper channels for information flow throughout the project.

Figure 1-1 illustrates the chain of command and interactive network between Quebecor, GES, and its subcontractors. Job descriptions of various titles are describes below.

- Quebecor Project Coordinator

  Diane Potts, the Quebecor Project Coordinator, is responsible for assuring that the project proceeds in accordance with the specifications detailed in the Final Consent Order and the CMI Work Plans, and for maintaining communication between Quebecor and the USEPA Project Coordinator.

- Project Administrative Director

  Kenneth J.K. Smith, L.S.P., the Project Administrative Director, is responsible for the staffing and overall administration of the project as well as final review and approval of technical reports.

- Project Manager

  Mark A. Sweitzer, P.G., the Project Manager, is responsible for maintaining a clear definition of and adherence to scope, schedule, and budget of the project; reviewing and assessing the adequacy of the performance of the assigned technical staff, the site construction and drilling contractors, and the laboratory; maintaining full and orderly project documentation; approving task plans and operating procedures related to the project; cooperating with the Quality Assurance Coordinator; providing a communication link with the USEPA and Quebecor in technical matters during the progress of the project; and supervising technical report preparation.

- Engineering Manager

  Charles B. Whisman, III, the Engineering Manager, is responsible for providing engineering and construction services support to guide and manage all components of the remedial system design and its implementation; preparing engineering deliverables; and providing project management support and client interaction on engineering-related topics.

- Quality Assurance Officer

  Jennifer Stafford, the Quality Assurance Officer, is responsible for sampling QC, including scheduling, planning, execution, and documentation of field quality assurance audits, as well as the issuing of corrective action requests. She will also be responsible for reviewing field notes for completeness and accuracy.

- Operations/Maintenance Manager

  Peter Huha, the Operations/Maintenance Manager, is responsible for the coordination and immediate direction of technicians involved in the operation and maintenance of the existing groundwater pump and treatment system. Other duties of the Operation/Maintenance Manager include review and analysis of system operation and remedial efficiency data.

- CMI Field Manager

  Robert Immel, the CMI Field Manager, is responsible for the implementation and documentation of the CMI field activities and adherence to accepted CMI program field procedures. Additional CMI Field Manager responsibilities include: supervising technicians or subcontractors executing CMI tasks; reviewing the effectiveness of field procedures and on-site interaction with USEPA and Quebecor during the progress of the project; providing support in community relations efforts; assisting in budgetary and schedule surveillance of the field work; advising the Project Manager of the progress of the CMI project; and preparing technical reports.

- CMI Technical Advisor

  Lisa Diaz Reigal, the CMI Technical Advisor, is responsible for technical review and maintaining the technical QA/AC integrity of the project.

- Health and Safety Coordinator

  Michelle Curley, the Health and Safety Coordinator, is responsible for providing technical coordination of the entire health and safety program. The health and safety program includes information on: medical programs, training requirements, hazard assessment, air monitoring, personal protective equipment, respiratory protection, and field implementation. The Health and Safety Coordinator must approve of any proposed revisions to the Health and Safety Plan.

- Quality Assurance Coordinator

  Donald Lancaster, the independent Quality Assurance Coordinator, is responsible for coordinating the quality assurance activities for the project and maintaining the integrity of the project in accordance to the specification of the Quality Assurance Project Plan (QAPP). The Quality Assurance Coordinator is also responsible for performing and supervising data validation activities, as well as for raw laboratory data review.

- Data Management Coordinator

  Renee Stansbury, the Data Management Coordinator, is responsible for ensuring that project documentation is properly maintained in the official project file.

- GES Equipment Coordinator

  Matt Lyon, the GES Equipment Coordinator, is responsible for maintaining all project field instrumentation, including equipment calibration and preventative maintenance, and scheduling equipment usage as requested by the Project Manager or CMI Field Manager.

- Laboratory QA Coordinator

  The Laboratory Coordinator is responsible for overseeing the laboratory QA program and conducting system and performance audits of the laboratory. The designated laboratory for this project will be Lancaster Laboratories, Inc. of Lancaster, PA; the designated contact will be Dee Brooks.

Phone numbers and addresses of project personnel are shown on Figure 1-1.

1.1 Training and Qualifications

All project tasks specified in the CMI will be performed by trained and qualified personnel. This includes, but is not limited to, project management personnel, subcontractors (i.e., drillers, laboratories), and all field sampling personnel.

All personnel involved in site investigation work have received 40-hour hazardous waste worker-site training program and applicable annual refresher, as specified in 29 CFR 1910.120e. Similarly, all site workers are experienced and trained in their respective sampling or data collection tasks. GES maintains strict record keeping guidelines for its employees and subcontractors, and the Health and Safety Coordinator is responsible for inspection of personal training certification files prior to site entry.

1.2 Responsibility of Procedures

The Project Manager and CMI Field Manager are responsible for the performance of all outlined tasks in the Program Management Plan (PMP) and Sampling and Analysis Plan (SAAP), except for QA/QC tasks. These tasks will be performed under their direction as specified in the Program Management Plan, the Sampling and Analysis Plan, or the Community Relations Plan (CRP). The QA Coordinator and QA Officer are responsible for the performance of all QA tasks, including data validation, performance, and system auditing, and QA reporting in accordance with the specification detailed in the Sampling and Analysis Plan. Any changes to these procedures must be formally presented to project management personnel for approval through the entire CMI project management team and the USEPA. Subsequent to approval, any modified procedures will be formally distributed to all project personnel.

1.3 Data Management Plan

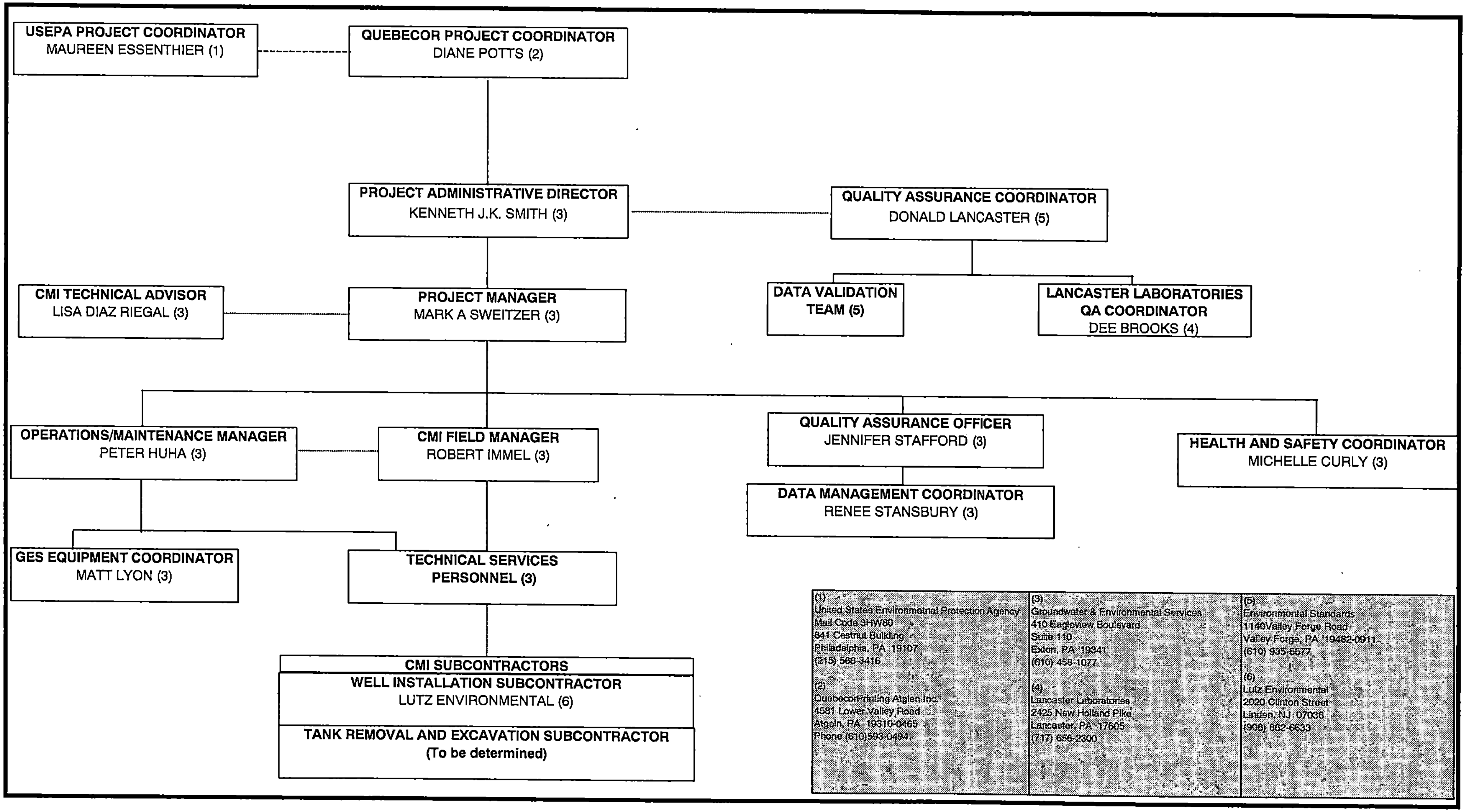
A complete description of the GES document control procedures is found in the Data Management Plan. The SAPP describes the procedures for data validation, reduction, and reporting. The objective of this plan is to provide documentation of the various steps from collection of raw data, to the compilation of reduced data for reports, and finally to the complete reports themselves, both project status reports and QA reports. Field notes, equipment calibration logs, quality assurance reports, corrective action forms, raw and reduced laboratory data, summary tables, graphs and charts, and all required CMI project reports (both project status and QA reports) will be included in the project file. Records management, overseen by the Data Management Coordinator, will ensure that documents are legible, identifiable, and retrievable.

<u>Field Logbooks</u>

All raw field data, including all information pertinent to field measurements, sample collection, and field observation, will be recorded in the field logbook. Recorded information is to include: date, time, sampler name, weather conditions, sampling purpose, sampling locations, type of sample collected, and analysis to be performed. Sampling methods are to be adhered to; however, should any deviation or addition to the sampling plan occur due to unforeseen circumstance, they are to be fully documented in the field logbook. Logbook entries will be made in waterproof ink, initialed, and dated.

FIGURE 1-1

CMI ORGANIZATIONAL CHART
QUEBECOR PRINTING ATGLEN INC.



2.0 QUALIFICATIONS OF KEY PERSONNEL

Key personnel of the CMI project team include: Project Administrative Director, Project Manager, Engineering Manager, Quality Assurance Officer, Technical Services Manager, Operations/Maintenance Manager, CMI Field Manager, CMI Technical Advisor, and Health and Safety Coordinator; specific responsibilities are described below. The CMI project team and its organization is illustrated in Figure 1-1.

2.1 Qualifications of GES Personnel

- PROJECT ADMINISTRATIVE DIRECTOR

Kenneth J.K. Smith, L.S.P.
Site Operations Manager / Principal Hydrogeologist

Education
B.S., Geology, University of Massachusetts
Post-Graduate Course Work in Hydrogeology, Boston University

Professional History
Groundwater & Environmental Services, Inc.
Environmental Engineering and Geotechnics, Inc.
Clean Harbors Environmental Engineering, Inc.

Technical Expertise
Mr. Smith has more than eleven years of environmental experience including eight years of project management conducting environmental site assessments and remedial actions. He has designed, installed, and operated groundwater and soil organic recovery and treatment systems including high vacuum dual-phase extraction, soil vacuum extraction, air sparging, and product/groundwater recovery and treatment. Mr. Smith's expertise is in conducting complex hydrogeological investigations for comprehensive site assessments, risk characterizations, and remedial action plans, including aquifer testing and fate and contaminant transport modeling.

Experience Summary
Mr. Smith is a Site Operations Manager for GES' Eastern Pennsylvania office and a Principal Hydrogeologist. He is responsible for technical oversight and guidance as well as financial, business development, and management for the office. GES' Eastern Pennsylvania office is staffed with over 30 personnel including project managers, engineering managers, senior and staff level hydrogeologists, geologist, engineers and scientist, and remedial technicians. The office provides a wide array of services including the following: all phases of environmental investigations from the initial to the comprehensive assessments featuring risk assessments and groundwater modeling; environmental permitting; regulatory consulting; expert testimony; and remedial system design, installation, and operation and maintenance.
Prior to becoming Site Operations Manager for GES' Eastern Pennsylvania office, Mr. Smith was Program Manager for the On-Site Comprehensive Assessment and Remediation (OSCAR) Program and Regional Manager of GES' New England offices. His duties

included the technical oversight, regional administration, and business development activities.

Prior to joining GES, Mr. Smith served as Vice President and Environmental Services Manager for Environmental Engineering and Geotechnics, Inc. and his responsibilities included management, business development, and technical expertise. Mr. Smith was responsible for overseeing all technical and business operations for the Northeast Regional Offices in Winchester, Massachusetts and Berlin, New Jersey and directed a staff of 15 people. Mr. Smith reviewed all technical reports and designs generated by the Northeast Regional Offices. Mr. Smith served as a project manager for Clean Harbors Environmental Engineering, Inc. located in Braintree Massachusetts where he directed and trained staff level engineers/geologists, conducted environmental investigations, and designed remedial action plans.

Registrations
Licensed Site Professional #7380, Massachusetts
Certified Subsurface Evaluator, New Jersey

Affiliations
National Ground Water Association
Licensed Site Professional Association
Society of American Military Engineers

- **Project Manager**

<u>Mark A. Sweitzer, P.G.</u>
Project Manager / Hydrogeologist

Education
B.S. Geology, Hartwick College

Professional History
Groundwater & Environmental Services, Inc.
Science Management Corporation (SMC)
Colletti Associates, Architects and Engineers

Technical Expertise
Mr. Sweitzer has over nine years of experience working with surface and subsurface hydrogeology. Mr. Sweitzer has five years experience with direct and indirect management of RCRA sites. He has initiated and managed projects for private clients, NJDEP, PADEP, NYDEC and USEPA.

Mr. Sweitzer is extensively familiar with soil gas surveys, site assessments, underground storage tank removals and the implementation of remedial alternatives. He has completed storm water management programs, groundwater flow models, USEPA- and State-specific risk assessments, and environmental impact statements.

Experience Summary
As a Hydrogeologist with the GES' Eastern Pennsylvania office, Mr. Sweitzer has managed or completed environmental investigations including Phase I and Phase II Environmental Site Assessments and UST Closures throughout Pennsylvania, New Jersey and New York. He is familiar and experienced with USEPA risk assessment protocol, USEPA RCRA protocol and reporting requirements, and State of Pennsylvania accepted risk assessment practices (RBCA). Further, he has authored RCRA facility investigation studies (RFI) and Corrective Measure Studies (CMS). Mr. Sweitzer assists in the design of soil vapor extraction and groundwater pump and treat remediation systems. He also conducts field investigations, including monitoring and recovery well installation; groundwater sampling and monitoring; subsurface soil sampling; soil vapor extraction testing; sustainable yield testing; pump testing and slug testing.

Mr. Sweitzer has extensive experience with high visibility ISRA cases and ISRA compliance. He previously worked with investigation and interpretation of chlorinated solvent movement in the New Jersey Brunswick Formation. Mr. Sweitzer has also interacted with NJDEPE / ECRA and has been involved with the compilation of clean up plans for ISRA sites. Mr. Sweitzer conducted extensive soil analysis at six chromium contaminated sites in New Jersey and also participated in the consolidation and overpacking of 300 drums of liquid and solid waste, comprised mainly of oils and consolidated pigments and dyes. Mr. Sweitzer has also authored a 350 page Environmental Impact Statement for a 600 unit subdivision project in New York state.

Prior to joining GES, Mr. Sweitzer conducted well installation and analysis of groundwater and contaminant flow in a fractured, karstified limestone at a Superfund site in central Pennsylvania. This job entailed sampling for pesticides, including mirex and kepone, and chlorinated solvents while in level "B" protection.

Registrations
Certified State of New Jersey Subsurface Evaluator
Professional Geologist, State of Pennsylvania

- **Engineering Manager**

Charles B. Whisman
Engineering Manager

Education
B.S., Civil Engineering, University of Pittsburgh

Professional History
Groundwater & Environmental Services, Inc.
Flour Daniel/Groundwater Technology Inc.
Pennsylvania Department of Transportation

Technical Expertise
Mr. Whisman has project and design experience with a wide range of petroleum products and contaminants including fuel oils, gasoline, and volatile organic compounds. He secures

regulatory permits for remediation system operation and produces monthly and quarterly reports. He is familiar with underground storage tank (UST) and OSHA regulations.

Experience Summary
As Engineering Manager for GES's Eastern Pennsylvania office, Mr. Whisman provides engineering support for projects involving contaminated soil and groundwater and oversees the design, installation, and operation of all types of remediation systems; oversees as well as conducts pilot tests; evaluates the efficiency of remediation technologies and systems, and creates detailed mechanical drawings such as piping and instrumentation diagrams, equipment compound layouts, and trenching specifications.

Mr. Whisman posses experience and expertise in groundwater/product recovery, high vacuum total phase extraction (HVTPE), soil vapor extraction (SVE), air sparging, phytoremediation, biological/chemical additions, bioremediation, and thermal ozone injection. Mr. Whisman has also performed risk evaluations regarding impact of gasoline and diesel contaminated waters in nearby surface waters.

Prior to joining GES, Mr. Whisman's work in the geotechnical and environmental units of the Pennsylvania Department of Transportation (PA DOT) included preparing the document "Emergency Response Procedures Concerning Petroleum Contaminated Soil in Department Right of Way" and reviewing engineering reports involving hazardous waste for technical content and accuracy.

He has performed numerous extensive feasibility studies to determine if existing product recovery and groundwater extraction systems could be enhanced via the addition of a vacuum. A regenerative blower was used to produce the vacuum enhancement, which resulted in elevated rates of fuel oil recovery (typically greater than 10 times the product recovery rate).

Registrations
OSHA 40-Hour Hazardous Waste Activities Training, 1994
OSHA 8-Hour Refresher for Hazardous Waste Activities (annual)
OSHA Excavation and Trenching Safety Regulations Competent Person Training, 1995

Training
Certificate, Environmental Engineering, University of Pittsburgh

- **Quality Assurance Officer**

Jennifer L. Stafford
Project Geologist

Education
M.S., Candidate in Engineering Geology, Drexel University
B.S., Geology, Juniata College

Professional History
Groundwater & Environmental Services, Inc.
RKR Hess Associates, Inc.
Roux Associates, Inc.

Technical Expertise
Ms. Stafford has been a practicing geologist in Pennsylvania and New Jersey with four years of environmental consulting experience. She has managed and performed hydrogeologic investigations, site contamination studies, and Phase I and II environmental assessments for a variety of clients and facilities. Her experience includes all aspects of project management, client liaison, and technical report preparation and review. In addition, she has constructed fate and transport models for risk-based closure projects. Recently, Ms. Stafford established company standards and procedures for producing groundwater flow and contaminant fate and transport models, utilizing Groundwater Modeling Software (GMS). Through these efforts, she has become proficient with GMS and computer modeling in general.

Experience Summary
As a Case Manager / Project Geologist at GES' Eastern Pennsylvania office, Ms. Stafford prepares groundwater flow and chemical fate and transport models involving computer programs such as the Method of Characteristics (MOC), Visual MODFLOW, and MT3D. She also manages several comprehensive site assessments associated with industrial sites.

Her responsibilities include development and implementation of groundwater flow and fate and transport models; preparation of proposals and workplans; coordination of workplan activities with clients, subcontractors, and regulatory agencies; participation in field activities; evaluation of data; and preparation and review of technical reports.

Prior to her work at GES, Ms Stafford was a Hydrogeologist with R.K.R. Hess Associates, Inc. While there, she managed and performed all aspects of site characterization assessments for private, commercial, industrial, and government clients. Her work included monitoring well installation and groundwater sampling activities; subsurface drilling and soil sampling activities; and Phase I and Phase II environmental assessments. These projects involved researching, investigating, and evaluating regional and local geologic and hydrogeologic conditions in each project area. In addition, Ms. Stafford was a team member for the preparation and presentation of several water supply and wellhead protection programs for Bucks and Monroe counties in Pennsylvania. These programs created data bases and criteria for detailed wellhead protection area delineations in representative hydrogeologic settings within each county using the three dimensional finite-difference groundwater flow model, MODFLOW, coupled with the semi-analytical particle tracking scheme, MODPATH, and geographic information system (GIS) overlays.

Training
OSHA 40-hour Hazardous Waste Site Safety Training
OSHA 8-hour Supervisory Training

- **Operations/Maintenance Manager**

Peter H. Huha, Jr.
Manager Technical Services

Education
Folcroft Vo-Tech School, Folcroft, Pennsylvania
Haverford High School, Havertown, Pennsylvania
Bonner High School, Upper Darby, Pennsylvania

Professional History
Groundwater & Environmental Services, Inc.
Groundwater Technology Inc.

Technical Expertise
Mr. Huha has more than ten years of experience working with large scale complex remedial systems. His expertise includes all aspects of construction services as well as system installation.

Experience Summary

As Manager of Technical Services for GES' Eastern Pennsylvania office, Mr. Huha is responsible for scheduling and oversight of a team of five environmental technicians. His extensive construction experience includes knowledge of plumbing and electrical systems.

Previously, Mr. Huha was a Master Technician of Field Services at Groundwater Technology Inc. Mr Huha's responsibilities included O&M on active remediation sites, installation of remediation equipment for groundwater treatment, soil venting systems, air sparging systems, pneumatic water treatment systems and oil recovery systems. Mr. Huha has experience in all types of field activities including the drilling of wells, UST removals, tank testing and troubleshooting equipment.

- **CMI Field Manager**

Robert W. Immel
Sr. Field Engineer

Education
B.S., Mechanical Engineering, Pennsylvania State University

Professional History
Groundwater & Environmental Services, Inc.
PILLING
C&D Charter Power Systems

Technical Expertise
Mr. Immel has over 8 years experience in the design, installation, operation and maintenance of groundwater and soil remediation systems. He has completed remediation at RCRA sites,

active and inactive industrial sites, service stations and bulk storage petroleum facilities. Mr. Immel has remediated sites impacted with separate-phase light non-aqueous phase liquids (LNAPL) and dense non-aqueous phase liquids (DNAPL), dissolved/abnormal phase petroleum hydrocarbons and chlorinated solvents.

Experience Summary
As Senior Field Engineer with the GES' Eastern Pennsylvania office, Mr. Immelspecializes in the installation and maintenance of large scale complex remedial systems, including the control, electrical, and telemtry components. Mr. Immel's project work includes: a subway remediation project, high vacuum applications involving Liquid Ring Pumps, positive displacement blowers and VR systems internal combustion engines and emergency response situations.

Prior to joining GES, Mr. Immel served as a Manufacturing Engineer with PILLING where he was responsible for process improvement and troubleshooting in machine shop, grinding, plating, and assembly departments. Mr. Immel implemented new products into production and resolved a leakage problem with a fiber optic illuminator. He also obtained CSA and UL certification of these units. He was responsible for selection, installation, and training of welding equipment, provided manufacturing input for MAPICS system, completed asbestos removal projects, and has a working knowledge of FDA/GMP regulations.

As a Project Engineer for C&D Charter Power Systems, Mr. Immel was responsible for the design, installation and start up of a conveyorized motive power battery finishing line. He also assisted with the start up and debugging of a custom made battery plate processing machine; installation, start up, debugging and training for a battery cell lid to jar heat seal machine and coordinated activities of outside contractors. Mr. Immel has had major involvement in the selection of the department CAD system and is proficient in the use of AutoCAD for plant layouts and project work.

Affiliations
National Ground Water Association
Licensed Site Professional Association
Society of American Military Engineers

- **CMI Technical Advisor**

<u>Lisa Diaz Riegel, P.G.</u>
Senior Project Manager / RCRA Specialist

Education
M.S., Engineering Geology, Drexel University
B.S., Geology, Duke University

Professional History
Groundwater & Environmental Services, Inc.
DuPont Environmental Remediation Services
DuPont Engineering
New Jersey Department of Environmental Protection

New Jersey Geological Survey
Amoco Production Company

Technical Expertise
Ms. Riegel has over 12 years experience in environmental investigation and remediation with roles as senior geologist, regulatory compliance and strategy development (primarily RCRA, CERCLA and NJ-ISRA regulations), project management and marketing/sales. She has managed full-scale hydrogeologic investigations, landfill closures, remedial alternative assessments and remedial design projects.

Experience Summary
As a Senior Project Manager/RCRA Specialist for the GES' Eastern Pennsylvania office, Ms. Riegel has managed the design and implementation of several preliminary RFIs at three major multi-SWMU facilities in EPA Regions II and III. Ms. Riegel posses expertise in field screening techniques (cone penetrometer with soil and groundwater sample collection and in filed gas chromatographic analysis), RCRA site RFI/remedial investigations, well installations, soil boring, soil and sediment sampling, tidal study, risk evaluation, statistical evaluation of data, Superfund hydrogeological investigations, and Phase II risk assessments.

Ms. Riegel has made technical presentations at public meetings representing the agency and industrial clients on environmental issues. Provided technical support to clients in preparing and implementing community relations programs (e.g., presented site hydrogeology in layman's terms for local residents).

Ms. Riegel assisted several industrial plants during the RFA process. This included preparing for EPA contractor inspection by conducting a preemptive inspection identifying areas of concern, recommending corrections, and identifying data gaps in existing information. She assisted four major multi-SWMU plants in commenting on draft RFA reports and commenting on and developing strategies for permit and order negotiations.

Ms. Riegel has prepared and presented seminars on remediation strategies and remediation project cost control for an outside commercial training organization.

Registrations
Professional Geologist: Delaware, Pennsylvania, Tennessee
Certified Professional Geologist, American Institute of Professional Geologists

Affiliations
American Institute of Professional Geologists
Association of Engineering Geologists, Membership Chairman, Regional Section

- **Health and Safety Coordinator**

Michelle Curley, CET, OHST
Corporate Health and Safety Officer

EDUCATION
B.S., Public Health: Environmental Health, West Chester University

PROFESSIONAL HISTORY
Groundwater & Environmental Services, Inc.

TECHNICAL EXPERTISE
Ms. Curley has over four years in the environmental field. She has overseen soil borings, monitoring well installations, underground storage tank removal operations and various construction activities. She has conducted air monitoring on various sites. Ms. Curley served as the Corporate Health and Safety Assistant from October 1993 to October 1995, as Pennsylvania Site Health and Safety Officer from September 1994 to April 1997 and as Corporate Health and Safety Officer from November 1995 to present.

EXPERIENCE SUMMARY
As the Corporate Health and Safety Assistant, Ms. Curley developed task-specific health and safety plans. She coordinated a corporate-wide Health and Safety purchasing program. She developed a Hazard Communication Program template and a DRAFT Labeling Program. As Corporate Health and Safety Officer she has conducted random, job site safety, and warehouse inspections for compliance with health and safety procedures and reviews findings with project and technical management. She has conducted monthly health and safety meetings, and instructed various short training courses. She conducts annual OSHA 8-hour refresher training seminars and Defensive Driving classes. She also conducts American Red Cross Standard First Aid/Adult CPR courses. Ms. Curley writes and publishes a quarterly health and safety newsletter to raise safety awareness throughout the company. She reviews, updates and maintains site- and task-specific health and safety plans, and coordinates medical monitoring and training schedules. She reviews and is current with federal and state regulations relating to health and safety.

REGISTRATIONS

American Red Cross Certified Instructor in Standard First Aid and Safety
Certified Environmental Trainer (CET) in Occupational Health and Safety
Occupational Health and Safety Technologist (OHST)

2.2 Laboratory Subcontractor

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605
Phone: 717 656-2300
Fax: 717 656-2681
Contact: Dee Brooks

Responsible for the analysis of all groundwater and soil samples collected during the installation of the CMI system; analysis of groundwater, system water influent and effluent samples, and air samples collected during system operations; and any applicable samples required for system closure.

A Statement of Qualifications package is located in Appendix A.

2.3 Data Validation Subcontractor

Environmental Standards
1140 Valley Forge Road
Valley Forge, PA 19482-0911
Phone: 610 935-5577
Fax: 610 935-1903
Contact: Donald J. Lancaster

Responsible for validation of all applicable laboratory data collected as part of CMI system construction, during system operation and following system operation.

A Statement of Qualifications package is located in Appendix B.

2.4 Well Installation Subcontractor

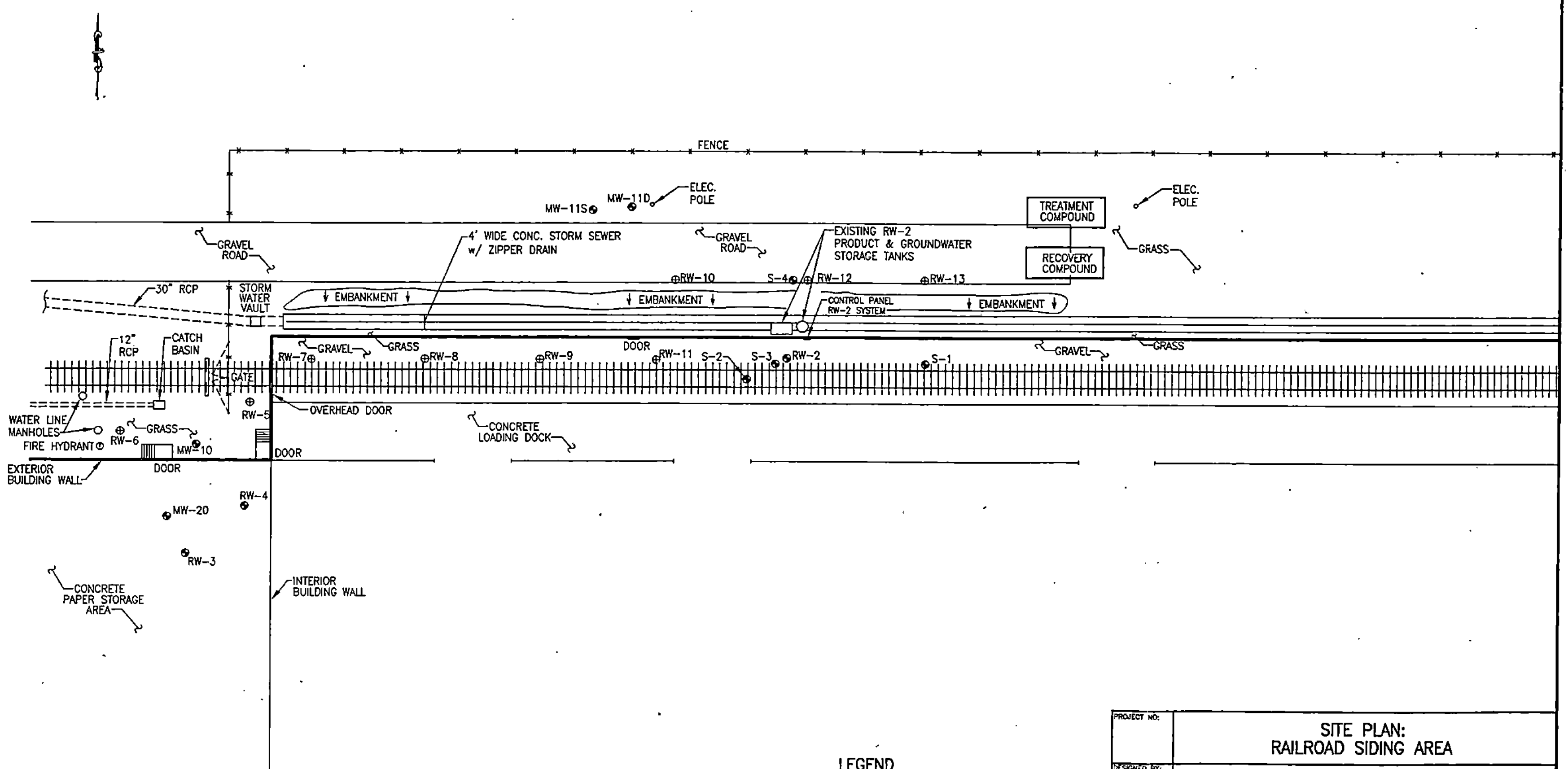
Lutz Environmental Company, Inc.
2020 Clinton Street
Linden, NJ 07036
Phone: 908 862-6633
Fax: 908 862-8883
Contact: Bob Coursen

Responsible for the proper installation of all CMI-required monitoring, recovery and extraction wells.

A Statement of Qualifications package company is located in Appendix C.

2.5 Tank Removal and Excavation Subcontractor

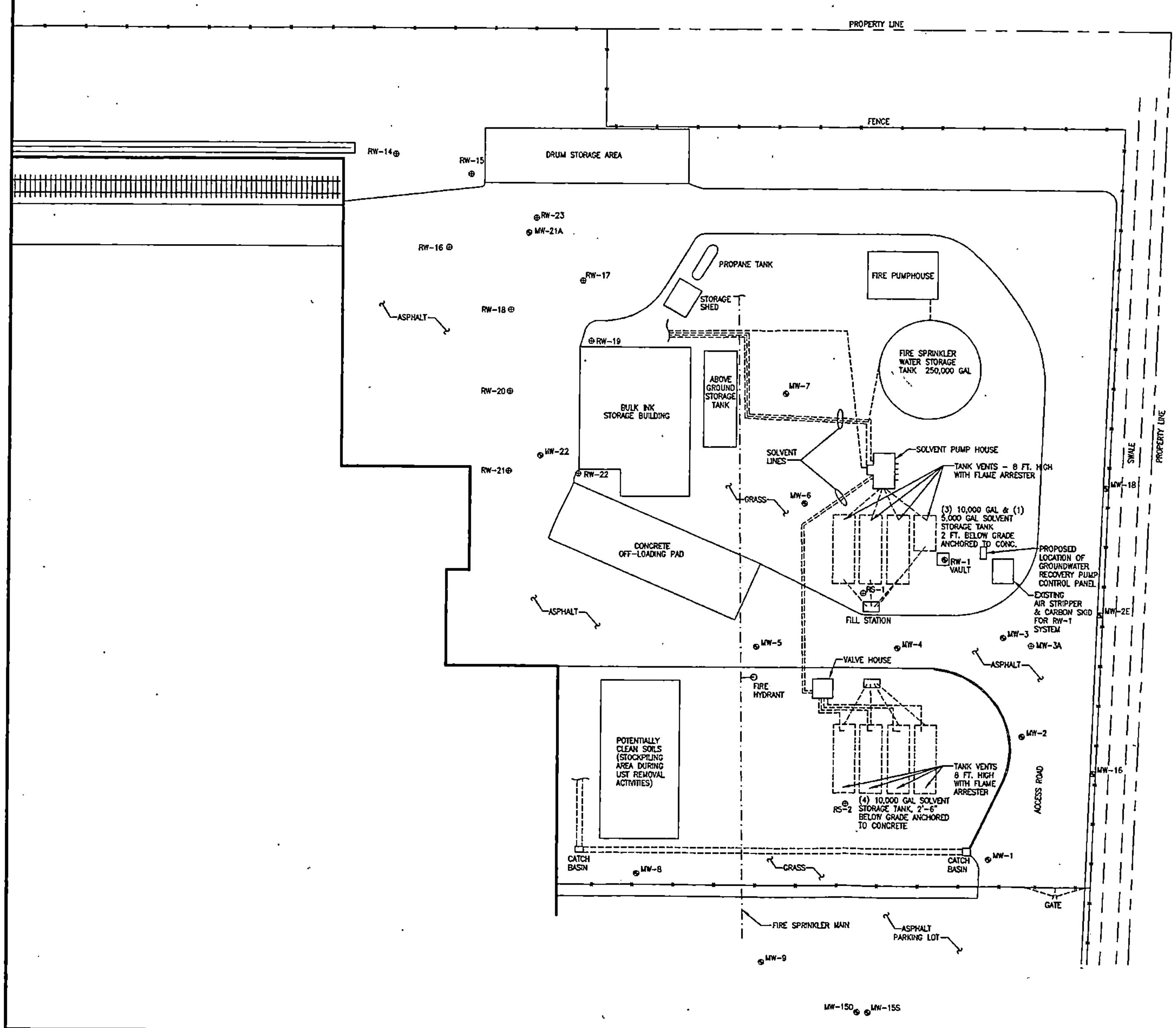
GES is currently proposing to utilize the same subcontractor for underground storage tank removal, trenching, backfilling, and waste removal. The chosen company will be responsible for all aspects of UST removal, subsurface activities, and waste management, under direct management of GES. At this time, the contractor for these services has not been chosen. GES strongly recommends waiting for approval from the EPA on the 50% Design package before selecting this subcontractor. Following 50% Design approval, GES will send out requests for proposal based on the agreed-upon, conceptual design. We believe this approach will assist in choosing a cost-competitive, qualified contractor in an expedient manner.



LEGEND

⊕	EXISTING MONITORING OR RECOVERY WELL
⊕	PROPOSED RECOVERY WELL
———	ABOVE GRADE PIPING
-------	BELOW GRADE PIPING

PROJECT NO:	SITE PLAN: RAILROAD SIDING AREA
DESIGNED BY: CW	PROPOSED REMEDIATION SYSTEM
DRAWN BY: GPL	QUEBECOR PRINTING ATGLEN INC. ATGLEN, PENNSYLVANIA
CHECKED BY: CW	GES GROUNDWATER & ENVIRONMENTAL SERVICES, INC.
APPROVED BY: KS	410 EAGLEVIEW BLVD., SUITE 110 EXTON PENNSYLVANIA 19431
SCALE: 1" = 30'	DATE: 4-23-98 DRAWING NO: FIGURE3-1



LEGEND

⊕	EXISTING MONITORING OR RECOVERY WELL
⊕	PROPOSED RECOVERY WELL
-------	BELOW GRADE PIPING

PROJECT NO:	SITE PLAN: TANK FIELD & LINE LEAK AREAS
DESIGNED BY: CW	PROPOSED REMEDIATION SYSTEM
DRAWN BY: GPL	QUEBECOR PRINTING ATGLEN INC. ATGLEN, PENNSYLVANIA
CHECKED BY: CW	GES GROUNDWATER & ENVIRONMENTAL SERVICES, INC.
APPROVED BY: KS	410 EAGLEVIEW BLVD., SUITE 110 EXTON PENNSYLVANIA 19431
SCALE: 1" = 40'	DATE: 4-23-98 · DRAWING NO: FIGURE 2

3.0 CORRECTIVE MEASURE DESIGN PLANS AND SPECIFICATIONS

3.1 CORRECTIVE MEASURE DESIGN STRATEGY

The finalized remediation goals for this site are outlined in the EPA-issued Final Decision (FD) and Final Consent Order (FCO), dated 16 June 1997 and 22 January 1998, respectively. These documents define EPA expectations of overall remediation, acceptable soil and groundwater cleanup standards, and allowable end points for the discontinuance of remedial action. The intention behind the Corrective Measures design was to develop a strategy that would aggressively achieve these remediation goals.

The basis for terminating active remediation will be dependent upon the remedial progress attained relative to the performance requirements and cleanup standards defined in the FCO. Specifically, active remediation will continue in the areas of concern until a basis for system deactivation is realized through either achievement of Media Clean-up Standards (defined below), or collection of sufficient performance data to support achievement or asymptotic levels in each area of concern. The specific Media Cleanup Standards, which will be used as a basis for system termination and site closure, are summarized below:

asym decl.

Soil Cleanup Standards

Compound of Concern	Concentration (ppm)
Benzene	n/a
Toluene	100.0
Ethylbenzene	70.0
Xylene	1,000.0
DEHP	n/a
PCE	n/a

Groundwater Cleanup Standards

Compound of Concern	Concentration (ppm)
Benzene	0.005
Toluene	1.0
Ethylbenzene	n/a
Xylene	n/a
DEHP	0.006
PCE	0.005

Per the FD, the definition of asymptotic levels is as follows:

> "Groundwater remediation at a particular well shall be deemed to be technically impracticable from an engineering perspective when the groundwater monitoring data from at least eight (8) consecutive quarterly samples from that well, analyzed for the contaminates of concern for which a waiver is sought, are subject to a statistical analysis that fails to show a decrease in such contaminant at a statistical probability of 0.05. The appropriate model for the analysis shall be that of an exponential function whose concentration decreases with time. The exponential model shall be calibrated using linear regression with time on the logarithms of the contaminant concentration data. A one-tailed hypothesis test on the regression slope shall be used to determine weather there is a significant downward trend. When the regression slope for any contaminant based on the most recent consecutive eight (8) quarters of groundwater monitoring data, is not significantly less than zero, (with the probability of Type I error less than 0.05), the groundwater concentration of that contaminant will be deemed asymptotic with time."

During system operation, groundwater will be monitored quarterly at 10 Point of Compliance (POC) monitoring wells, and biannually at 10 POC plus 8 additional wells, selected to monitor the progress of remediation. Per stipulations of the Final Consent Order, analysis of chemicals PCE and DEHP may be discontinued if data is gathered to suggest these chemicals are not present at the site.

Following the termination of active remediation in each area of concern (active remediation will continue for a minimum of three years), biannual groundwater quality monitoring in compliance-monitoring wells shall continue for a minimum of two years to confirm that the Media Cleanup Standards are attained. If, after a minimum of three years of active remediation, it is determined that attaining Media Cleanup Standards is technically impractical for a specific Area, well, and/or chemical of concern, a waiver to one or more of the Media Standards will be requested for that Area, well, and/or chemical of concern.. The waiver will be prepared to justify elimination of one or more chemicals of concern based on the presence of asymptotic declines with respect to individual chemicals of concern as defined in the FD and FCO.

asym declines

After attainment of the remediation goals, GES will prepare a project closure report for submittal to regulatory agencies. The following subsections summarize the remedial goals for each area, and general requirements necessary to complete remediation.

3.1.1 Tank Field Area

- Remove underground storage tanks (USTs) and adjacent, impacted soils in accordance with the Quebecor UST Removal Sampling Plan (dated 7 July 1994) and stipulations in the Site Sampling Plan (Section 3.0). Tanks will be removed in two individual phases. Phase 1 will entail the removal of the four southern tanks and impacted soils. Phase 2 will entail removal of the four northern tanks and impacted soil.
- Completion of an UST Closure Report in accordance with PADEP UST regulations.
- Proper disposal of all USTs.
- Remove soils impacted above Media Cleanup Standards to ensure that impacted soils do not continue to impact groundwater. It is anticipated that 200 to 300 cubic yards of soil are will be removed. If significantly greater volumes or soil are required for removal or the soil removal operations encroach on adjacent buildings or roadways, alternative soil remedial methods may be required
- Design the groundwater removal and associated treatment system to remediate the dissolved chemicals of concern in groundwater to levels below the Media Cleanup Standards (as defined by the EPA).
- If remediation of groundwater to the Media Cleanup Standards is proven to be technically impracticable or if concentrations reach an asymptotic limit before Media Cleanup Standards are met, provisions are defined in the FD and FCO to discontinue or abbreviate remediation. Abbreviated remediation is considered the elimination of specific wells, chemicals or concern, or entire areas; however, conditions are not met to obtain closure for the entire site.

  asym decl
- Obtain closure for this area.

3.1.2 Railroad Siding Area

- Install nine new recovery wells and collect preremediation soil samples.
- Install a high-vacuum, total phase extraction (HVTPE) system within this area, capable of remediating adsorbed-phase solvents in the soils (via soil vapor extraction) and dissolved-phase solvents in groundwater (via groundwater recovery) to below Media Cleanup Standards.
- If remediation of groundwater to the Media Cleanup Standards is proven to be technically impracticable or if concentrations reach an asymptotic limit before Media Cleanup Standards are met, provisions are defined in the FD and FCO to discontinue or abbreviate remediation. Abbreviated remediation is considered the elimination of specific wells, chemicals or concern, or entire areas; however, conditions are not met to obtain closure for the entire site. asym. decl
- Obtain closure for this area.

3.1.3 Line Leak Area

- Install a HVTPE system within this area, capable of remediating adsorbed-phase solvents in the soils (via soil vapor extraction) and dissolved-phase solvents in groundwater (via groundwater recovery) to below media cleanup levels.
- If remediation of groundwater to the Media Cleanup Standards is proven to be technically impracticable or if concentrations reach an asymptotic limit before Media Cleanup Standards are met, provisions are defined in the FD and FCO to discontinue or abbreviate remediation. Abbreviated remediation is considered the elimination of specific wells, chemicals or concern, or entire areas; however, conditions are not met to obtain closure for the entire site. asym decl
- Obtain closure for this area.

3.2 CORRECTIVE MEASURE DESIGN BASIS

All data collected throughout the RCRA process and associated investigations were reviewed to determine the most appropriate conceptual designs of the remediation technologies to be installed at the Quebecor facility. This includes soil and groundwater quality data, pump and slug test data, and soil physical parameters data collected during the RFI (completed by GES, dated 17 August 1994), investigative work completed in the Line Leak Area (completed by GES and included in the Line Leak Area Interim Measures Workplan, dated 26 June 1996), and remedial options and pilot tests considered in the Corrective Measures Study (completed by GES, dated 29 September 1994). The remedial strategy has been designed in accordance with current environmental and public health standards. Design calculations, reference material, historical pilot test, slug test, and pump test data are contained in the Corrective Measures 50% Design Report. This design report provides the outline of our approach to design, install, and operate the following remediation systems, which were selected as the most efficient and effective means to fulfill the remediation requirements of the facility's FCO:

- HVTPE for remediation of soil and groundwater at the Railroad Siding Area.

- HVTPE for remediation of soil and groundwater at the Line Leak Area.

- Tank removal and soil excavation activities followed by groundwater recovery at the Tank Field Area.

The remediation strategies in the three Areas as described above have been designed in order to provide a detailed depiction of remediation system components and processes. Remediation system engineering drawings and additional specifications are included in the 50% Design Report.

GES engineering personnel will provide system start-up and operation procedures and maintenance training to GES field service personnel to explain required protocols and requirements. These requirements are detailed within the operation and maintenance section of this report. Equipment servicing forms will be prepared as part of the 90% Design Submittal to ensure that the proper data are acquired and to assist in tracking the performance of the remediation system.

3.2.1 Excavation and Groundwater Recovery – Tank Filed Area

Excavation is an effective means to remove solvent source areas (separate-phase solvent (SPS) and adsorbed-phase solvents) in the vicinity of the USTs in the Tank Field Area. Removing SPS and adsorbed-solvent source areas will assist in the reduction of dissolved-phase solvent concentrations in groundwater.

As detailed in Section 3.2 of the 50% Design Report, the eight USTs will be removed in two phase. Phase one will entail the removal of the four USTs in the Southern Tank Field, excavation of impacted soil, soil sampling, backfilling, and instillation of a new roadway above the former location of the Southern Tank Field. Phase 2 will entail the removal of the four USTs in the Northern Tank Field, excavation of impacted soil, soil sampling, backfilling. Additional details are provided in Section 3.2 of the 50% design report.

Strategic excavation will be conducted to properly remove the impacted soil. The groundwater pumping system to be installed following excavation, consisting of two groundwater recovery sumps (one in each former tank field) retrofitted with electrical submersible groundwater pumps, will be capable of reducing dissolved-phase concentrations to Media Cleanup Standards. The respective recovery sumps will be installed in the permeable backfill material placed in the excavated area following tank removal activities. The permeable backfill material will enhance the yield, and subsequently the hydraulic control, of groundwater in the vicinity of the two former tank fields via the electrical submersible groundwater pumps. Details of the two groundwater recovery sumps are included in the 50% Design Report.

3.2.2 High-Vacuum, Total-Phase Vacuum Extraction (HVTPE) – Railroad Siding and Line Leak Areas

HVTPE systems use recovery wells to extract groundwater, soil vapors, and SPS by creating a high vacuum at the bottom of a drop pipe installed below the water table in each HVTPE recovery well. The high vacuum pulls soil vapors through the exposed soil profile and removes solvent vapors while importing clean air from unaffected areas, promoting volatilization of solvents from impacted soils and encouraging natural biodegradation of chemical constituents. The high vacuum enhances groundwater and SPS recovery by increasing the pressure gradient towards the HVTPE wells, aiding the solvent's ability to travel from a high-pressure area within the capillary fringe to a lower pressure area in the recovery wells. Detail of the HVTPE wells are included in the 50% design report.

A HVTPE system will have the following advantages:

- More aggressive source removal due to the additional wells within the solvent plume (resulting in decreased time until area remediation is accomplished).

- The combination of vapor extraction and groundwater recovery via one blower is much more efficient than utilizing separate pumps and blowers. Trenching and piping is simplified because HVTPE piping networks usually are designed with main header pipes which branch off to individual wells, thereby reducing the number of pipes and conduit required in system trenches.

3.3 CORRECTIVE MEASURE DESIGN DETAILS

A HVTPE recovery compound (to house soil vapor/groundwater recovery equipment) will be installed between the Line Leak Area and the Railroad Siding Area to provide centralized equipment to extract soil vapors and groundwater from the three areas of concern, significantly reducing the complexity of the overall remediation system. Centralized groundwater treatment equipment will be housed in a treatment compound that located next to the recovery compound **(Figure 3-1)** and centralized soil vapor treatment equipment will be located outside of the two equipment enclosures. Recovered groundwater from the Tank Field Area will be directed to the groundwater treatment compound

A total of 25 HVTPE wells (15 in the Railroad Siding Area and 10 in the Line Leak Area) will be plumbed to three high-vacuum blowers located in the recovery compound. A total of two groundwater recovery sumps will be installed in the Tank Field Area for groundwater recovery. Most HVTPE and groundwater recovery piping and conduit will be installed within sub-grade trenches, with the remaining portion installed as aboveground piping. The proposed sub-grade-trenching network will range in width from 2 to 3 feet, and in depth from 3 to 4 feet. Recovery wells located within the Railroad Siding enclosure (recovery wells RW-2, RW-7, RW-8, RW-9, RW-11, and S-3) will manifold via aboveground piping in an effort to minimize disruptions in the vicinity of the railroad spur. The HVTPE piping will consist of a series of 3-inch, 4-inch, or 6-inch header pipes that reduce to 2-inch pipes manifolded to each extraction well. Each HVTPE header will be manifolded to up to ten extraction wells. Trenching and piping details for the two groundwater recovery sumps and trenching and piping details for the HVTPE well network are included in the 50% Design Report.

Initially, a total of 18 of the 25 HVTPE recovery wells (11 of 15 Railroad Siding Area recovery wells and 7 of 10 Line Leak Area recovery wells) will be utilized for extraction. As system operating parameters and groundwater quality data are obtained and evaluated, the HVTPE and groundwater recovery systems will be adjusted to maximize solvent recovery rates in impacted areas. Any area where HVTPE remediation is found to be complete can be taken off-line by rerouting the vacuum and vapor flow that was used for previously operating wells and apply it to remaining, more-impacted areas. This is an important "pulsing" aspect of the system since the most-impacted areas can be remediated more aggressively as other areas are cleaned.

3.3.1 Tank Field Area

GES will utilize strategic excavation and groundwater recovery in the Tank Field Area for the following reasons:

- It will result in the most efficient source removal means via excavation,
- It is predicted to be the most effective means to accomplish the goal of remediation in the shortest operational period, and
- Groundwater treatment equipment for the Line Leak and Railroad Siding Areas could be utilized to treat recovered groundwater.

As stipulated in the Final Consent Order for the facility, EPA is lead agency on soil and groundwater remediation issues at the tank field; however, PADEP will be lead agency on administrative issues related to the UST removal, including Notification of Removal forms, completion of a Closure Report and sampling of soils for closure. Previously, the PADEP reviewed and approved a GES-developed UST Removal Sampling Plan, dated 7 July 1994. For clarification, the plan requires the following elements:

- During UST excavation, all removed soils will be screened with an organic vapor monitor (OVM) for the presence of total organic vapors. Grossly impacted soils (defined as soils saturated with product or soils with an OVM reading greater than 1,000 units) will be loaded into trucks and immediately removed from the site for disposal.
- After removal of USTs from each of the two tank fields, one soil sample will be collected from each wall of each excavation (for a total of eight samples).
- Samples will be collected at the soil water interface.
- Samples will be analyzed for Toluene, Ethylbenzene, and Xylenes (TEX) via EPA Method 8020.
- Since we anticipate groundwater will be encountered during UST removal, two water samples will also be collected from each excavation and analyzed for benzene and toluene via EPA Method 8020.

GES intends to complete this sampling protocol, as approved. However, it is understood that this sampling protocol may be insufficient to provide data to show that the soil Media Cleanup Standards presented on Table 1 of the USEPA Final Decision have been met.

In order to supply the necessary soil quality data, GES intends to add the following elements to the sampling plan submittal:

- After removal of USTs from each of the two tank fields, a total of ten soil samples will be collected from each excavation at the soil water interface. Samples will be analyzed for TEX via EPA Method 8020.
- Following collection of the soil samples, they will be submitted for 24-hour laboratory analysis. Upon receipt of analytical data, additional excavation will be completed at any locations where analytical results exceed soil cleanup standards. Following this excavation, additional confirmatory soil samples will be collected and analyzed for TEX.
- This process will continue until concentrations of chemicals of concern in soil are below Media Cleanup Standards or until the excavation encroaches into areas critical for plant access or near foundations of adjacent structures. Should excavation activities extend beyond the anticipated

bounds of impact (removal of 200 to 300 cubic yards of soils is anticipated) and further excavation is unfeasible, provisions for including a soil remediation system in the tank field area may be required.

- All samples will be analyzed for TEX via EPA Method 8020.
- Since encountering groundwater is anticipated during UST removal, two water samples will also be collected from each excavation and analyzed for benzene and toluene via EPA Method 8020.

Removal of this soil by strategic excavation will avoid having chemicals of concern leaching back into groundwater. This task also involves the installation of a two-well groundwater recovery sumps that are anticipated to extract groundwater impacted with residual, dissolved-phase solvent and finally reduce overall concentrations in groundwater to below designated Media Cleanup Standards.

As presented, this approach will complete remediation of the Tank Field Area in three distinct phases:

(1) Removal of existing USTs (seven 10,000-gallon USTs and one 5,000-gallon UST),

(2) Removal of soils impacted at concentrations above the Media Cleanup Standards in the immediate vicinity of the USTs (up to 300 tons of soil is estimated to be removed) followed by post excavation soil sampling, and

(3) Well installation and remediation of remaining impacted groundwater via groundwater recovery.

3.3.1.1 Tank-Anchoring Slab

Please note that during the first week of March 1998, Quebecor located as-built drawings for the existing facility Tank Fields. Prior to location of the drawings, Quebecor and GES were unaware of the UST construction details. Most notably, the information on the as-built drawings shows that the USTs are located on and anchored to a continuous, 30 foot by 40 foot by 1-foot thick reinforced concrete slab (one slab per tank field). Per the drawings, the concrete slabs are shown to extend to 11.5 feet below grade.

Based on this information, GES will propose to leave the concrete slab in place following removal of underground storage tanks. GES is aware that this slab will limit the collection of any soil samples from beneath the tank. However, GES believes that the following information substantiates an argument for leaving the slab undisturbed:

- The concrete is assumed to be impermeable and would significantly limit the downward migrations of chemicals of concern beneath the USTs.
- The groundwater table has never been known to drop below 11.5 feet below grade (depth of the bottom of the slab) in the vicinity of the UST fields. Weekly depth-to-water data collected between December 1991 and August 1997 for wells MW-4 and MW-8 (both wells are located in the vicinity of the tank fields) show that depth-to-water readings have never dropped below 10.5 feet below grade during this monitoring period and have only dropped below 9.5 feet below grade on three individual occasions.

- All liquids previously stored in the site USTs are classified as light-nonaquous phase liquids (LNAPLs). Any released LNAPL will tend to stabilize near the top of the water table, located above the concrete slab.
- Attempts to core or bore through the concrete slab for the purpose of sample collection could create a preferential pathway for impacted groundwater to move below the slab.
- Removing the slab would create significant concerns with waste disposal and health and safety.

3.3.1.2 Waste Classification and Sub-Slab Soil Sampling

Prior to UST removal, GES intends to utilize a Geoprobe or drill rig to collect soil samples from approximately ten different locations surrounding the two tank fields. The purpose of the samples will be to complete the laboratory analysis necessary for waste disposal classification in advance of any excavation of soils in the Tankfield Area.

As currently planned, GES will collect and analyze the soil samples for waste disposal parameters and gain pre-approval for waste disposal at an approved facility prior to the commencement of excavation. This process is intended to allow excavated soils from the UST area to be loaded directly into dump trucks and transported offsite on the same day of excavation, thus eliminating the need to store hazardous soils in on-site roll-off containers.

Since GES is aware of the need to determine soil quality beneath the concrete slab underlying the USTs, GES proposes to collect soil samples from approximately 12 feet to 14 feet below grade, concurrent with the soil preclassification sampling. The samples would be collected as close to the edge of the USTs as possible (and as close to the concrete slabs) without risking damage to the in-place tanks. However, no attempts would be made to penetrate the slabs. The 12 to 14 foot samples would be for the specific purpose of assessing soil quality beneath the depth of the concrete slab. Laboratory analysis would be completed for TEX via EPA Method 8020, plus all additional parameters required for waste classification.

3.3.1.3 Backfilling and Tankfield System Installation

The two excavated UST tank fields will be backfilled with permeable stone (3/8" pea gravel). The concrete slabs underlying both tank fields will not be removed. The groundwater recovery system installed in the Tank Field Area will consist of recovery sumps RS-1 and RS-2 (one sump located in the each of the two former tank field excavations). Due to the high permeability of the tank field backfill material, one groundwater recovery sump in each of the two tank field excavations will be utilized to provide hydraulic control throughout the permeable backfill material, controlling downgradient movement of solvent-impacted groundwater. Pumping activities will also encompass groundwater capture in native soils beyond the boundaries of the more permeable backfill material. Two electric submersible groundwater pumps will be installed in the two sumps for groundwater recovery. Recovered groundwater from this area will be directed to the groundwater treatment compound for treatment via air stripping and liquid-phase carbon.

Strategic excavation will entail the excavation of all soils determined to contain chemicals of concern at concentrations greater than soil Media Cleanup Standards. Excavation will also remove significant quantities of soil containing adsorbed-phase solvent. Removal of this soil will avoid having chemicals of concern leaching back into groundwater. This task also involves the installation of a two-well groundwater recovery system. These wells are anticipated to extract groundwater impacted with residual, dissolved-phase solvent and finally reduce overall concentrations in groundwater to below designated Media Cleanup Standards.

As presented, this approach will complete remediation of the Tank Field Area in three distinct phases:

- Phase 1 - Removal of existing USTs (seven 10,000-gallon USTs and one 5,000-gallon UST);
- Phase 2 - Removal of soils impacted at concentrations above the Media Cleanup Standards in the immediate vicinity of the USTs (up to 300 tons of soil is estimated to be removed); and
- Phase 3 - Well installation, and remediation of remaining impacted groundwater via groundwater recovery.

The two excavated UST tank fields will be backfilled with permeable stone (3/8" pea gravel). The concrete slabs underlying both tank fields will not be removed. The groundwater recovery well that will be installed in the Tank Field Area will consist of recovery sumps RS-1 and RS-2 (one sump located in the each of the two former tank field excavations). Pumping activities will also encompass groundwater capture in native soils beyond the boundaries of the more permeable backfill material. The locations of the proposed sumps are indicated on **Figure 3-2**. Two electric submersible groundwater pumps will be installed in the two sumps for groundwater recovery. Recovered groundwater from this area will be directed to the groundwater treatment compound for treatment via air stripping and liquid-phase carbon.

3.3.2 Railroad Siding Area

In the Railroad Siding Area, existing soil-quality and groundwater-quality data suggest that the majority of adsorbed-phase and separate-phase solvent impact is located between recovery well RW-2 and monitoring well MW-10. Pilot testing data completed in this area and summarized in the Corrective Measures Study indicate that groundwater recovery and soil vapor extraction (via HVTPE) will provide the most aggressive and effective remediation of solvent-impacted soil and groundwater.

Data from vapor extraction pilot testing and groundwater extraction pumping tests indicate that a vapor extraction radius-of-influence of 15 to 38 feet will be observed. In order to aggressively remediate the impacted soil and groundwater, and corresponding to a conservative radius-of-influence of 15 feet, GES will utilize recovery wells located approximately 30 feet apart throughout the impacted area. Proposed locations are indicated on **Figure 3-1 and 3-2**. A total of 9 proposed wells (RW-5, RW-6, RW-7, RW-8, RW-9, RW-10, RW-11, RW-12, and RW-13) and 6 existing wells (MW-10, RW-2, RW-3, RW-4, S-3, and S-4) will be connected to the recovery system.

Trenches will be excavated for the placement of vapor/groundwater conveyance piping between the wells and the extraction equipment located in the transfer compound. Existing and proposed recovery wells located within the Railroad Siding and in close proximity to the railroad tracks (RW-2, RW-7, RW-8, RW-9, RW-11, and S-3), will be connected to remediation equipment via above-ground piping prior to transitioning to below-ground piping.

Soil vapors and groundwater will be extracted from the 15 extraction wells in the Railroad Siding area via two high-vacuum blowers. The two blowers specified for this application are capable of removing a respective total of 186 and 155 cubic feet per minute (cfm) of air at a vacuum of 24 inches of mercury.

Recovered soil vapors and total fluids will be separated in the recovery compound. The recovery compound will house the high-vacuum blowers, knockout tanks, transfer pumps, and oil water separator. Recovered groundwater will then be pumped to the groundwater treatment compound for air stripping, and carbon polishing prior to storm sewer discharge (permit pending). Soil vapors will be directed to vapor-phase carbon units located outside of the two compounds.

3.3.3 Line Leak Area

Historical soil and groundwater quality data from the Line Leak Area indicate that soil impact may extend to a depth of 12 feet below grade. In order to remediate the adsorbed solvent mass, which is the source of elevated dissolved-phase solvent concentrations, the water table will need to be lowered to expose currently-saturated soils for vapor-phase recovery. Since groundwater recovery yields are low in this area, a HVTPE system will provide an effective and aggressive remediation approach for soil vapor and groundwater recovery. A HVTPE system within the Line Leak Area would be combined with the HVTPE system at the Railroad Siding Area, resulting in reduced capital equipment costs and operation and maintenance costs. The HVTPE system will not only remediate impacted soil within the solvent "smear" zone, but is also anticipated to vent the sub-base of the asphalt which also may include solvent impact. Long-term HVTPE operation in the Line Leak Area is expected to result in the dewatering of the perched aquifer located directly beneath the asphalt sub-base.

Soil vapors and groundwater will be recovered from ten recovery wells located within the Line Leak Area spaced 30 to 35 feet apart. Proposed well locations are indicated on **Figure 3-1 and 3-2**. Based on this well spacing, a minimal radius-of-influence of 15 feet will be achieved to remediate the impacted area. One high-vacuum blower will be used to recover soil vapor and groundwater from 10 HVTPE wells. The blower, located in the recovery compound, will be capable of 182 cfm flow rate at a vacuum of 24 inches of mercury. This allows the extracted total-phase stream from the Line Leak Area to be routed through the common separation, pumping, and treatment equipment.

3.4 REMEDIATION SYSTEM EQUIPMENT IDENTIFICATION AND SPECIFICATIONS

The remediation system to be installed in the Line Leak and Railroad Siding Areas will include three HVTPE blowers (one for the Line Leak Area and two for the Railroad Siding Area). The HVTPE blowers will remove total fluids and soil vapors from designated extraction wells. Groundwater will be recovered from the Tank Field Area using two electric submersible pumps.

Most of the remediation system recovery, separation, and treatment equipment will be housed in two compounds located behind the Railroad Siding shed: (1) the recovery compound, and (2) the groundwater treatment compound. All vapor-phase carbon units and the product recovery tank will be placed outside of the two compounds.

Recovered fluids and vapor from the Railroad Siding and Line Leak Areas will be separated in the recovery compound, where the total fluids stream from the HVTPE system will be separated from the vapor stream in a vapor/liquid separator tank. The total fluids stream will be directed through an oil/water separator, where recovered solvent will gravity-drain to a product recovery tank. The recovered groundwater stream from the Tank Field Area will combine with recovered groundwater from the Railroad Siding and Line Leak Areas prior to treatment in the groundwater treatment compound. The combined groundwater stream will be pumped from the recovery compound to the treatment compound for treatment via air stripping and liquid-phase carbon polishing. Treated groundwater will be discharged to an unnamed tributary of Valley Creek; the same out fall location will be utilized as is currently in use for the existing, permitted groundwater discharge. A modification to the existing NPDES permit will be requested from the PADEP. Soil vapors from the air stripper off-gas will be directed to a vapor-phase carbon unit.

3.4.1 Tank Field Area Equipment

The principle remediation components to be installed the Tank Field Area are:

- An electrical submersible groundwater pump will be installed in recovery sump RS-1 to provide hydraulic control in the vicinity of the former northern tank field, and
- An electrical submersible groundwater pump will be installed in recovery sump RS-2 to provide hydraulic control in the vicinity of the former southern tank field.

The two tank field pumps will operate via conductivity level controls installed within each recovery sump. The control panel to interlock the conductivity level probes will be located in the northern Tank Field Area in the vicinity of the existing remediation system. Recovered groundwater will be pumped to the recovery compound, where the groundwater stream will combine with groundwater from the Line Leak and Railroad Siding Areas prior to treatment. Upon an alarm condition in the recovery or groundwater treatment compound systems, a signal will be sent to the Tank Field Area control panel that will deactivate the submersible pumps immediately.

3.4.2 Recovery Compound Equipment

The principle components to be located in the recovery compound are:

- Vapor/liquid separators segregate recovered soil vapor stream from recovered total fluids stream,
- The transfer pumps direct recovered total fluids from VLS-1,2,3 to OWS-1,
- The oil/water separators segregate recovered SPS from groundwater,
- The vapor/oil separators for each LRP skid (separates and reuses oil used for liquid sealing of each LRP),
- The heat exchangers cool re-circulated oil for each LRP, and
- The air filters remove fine particles from vapor stream before processing through LRPs,

The proposed recovery compound consists of the following equipment operating parameters:

- The three proposed HVTPE blowers (Railroad Siding and Line Leak Areas) will extract from a total of 25 HVTPE extraction wells.

- A vapor/liquid separator tank will be installed prior to each vacuum blower to separate recovered water and solvent from the vapor stream. Each vapor/liquid separator will contain a high level probe which will disengage its respective vacuum blower when the tank is full.

- The solvent and water will be routed through a solvent/water separator and then gravity fed into either a groundwater holding tank or a solvent recovery drum. The solvent/water separator segregates the SPS from the groundwater following the turbulent vacuum extraction process. A coalescing separator removes free and dispersed solvent droplets (20 microns and greater) from the recovered groundwater. Recovered SPS is directed into a solvent storage tank. If the product storage drum, oil/water separator, or transfer sump tank is full, high-level shut-off probes will shut down the vacuum blowers.

- Groundwater will gravity drain from the solvent/water separator to the holding tank. Two transfer pumps will direct the treated groundwater into the treatment compound for treatment.

- The control panel will deactivate the two groundwater recovery pumps in the Tank Field Area upon a system shut-down.

3.4.3 Groundwater Treatment Compound Equipment

The principal components to be located in the groundwater treatment compound are:

- Two particulate filters remove suspended solids prior to air stripping,
- The low-profile air stripper treats the influent groundwater stream with a removal efficiency of >99%,
- The air stripper blower is utilized to move air through the air stripper, resulting in the transfer of dissolved solvent to the vapor stream,
- Transfer pumps direct treated groundwater from the air stripper sump through two additional particulate filters and two liquid-phase carbon units,
- Two particulate filters remove suspended solids that are created through the air stripping process prior to carbon treatment , and
- Two liquid-phase carbon units (plumbed in series) are utilized to remove any dissolved solvents (with a removal efficiency >99% through each unit) that remain in the water stream following air stripping.

The proposed groundwater treatment compound consists of the following equipment operating parameters:

- The groundwater treatment compound treats recovered groundwater from each of the three areas. Recovered groundwater will be pumped directly from the recovery compound.

- The holding tank allows groundwater which gravity drains from the oil/water separator to be stored for subsequent pumping through the groundwater treatment system,
- The transfer pumps direct groundwater to the groundwater treatment compound for subsequent treatment,
- Liquid ring pump for Railroad Siding Area,
- A particulate filtration system will remove suspended solids from the recovered groundwater stream prior to the low-profile air stripper and prior to carbon treatment to prevent sediment accumulation in the air stripper and liquid-phase GACs.
- The groundwater treatment system will consist of a low-profile air stripper and four high-pressure liquid-phase GACs. These two treatment methods will be utilized in order to ensure that effluent TEX concentrations are within NPDES limitations.
- System alarm conditions will include the following: high pressure on effluent water line, high air stripper sump level, and high pressure on the air stripper blower.
- The control panel will deactivate the two groundwater recovery pumps in the Tank Field Area upon a system shut-down.

3.4.4 Components to be Located Outside of the Recovery and Groundwater Treatment Compound

The principal components to be located outside of the recovery and groundwater treatment compounds are:

- Two vapor-phase carbon units will be utilized to treat the vapor stream from LRP-1,
- Two vapor-phase carbon units will be utilized to treat the vapor stream from LRP-2,
- Two vapor-phase carbon units will be utilized to treat the vapor stream from LRP-3,
- One vapor-phase carbon unit will be utilized to treat the air stripper off-gas vapor stream , and
- A secondary-contained product recovery tank will be utilized to contain recovered product that drains from the oil/water separator.

3.5 REMEDIATION SYSTEM SUB-GRADE TRENCHING

GES will subcontract all trenching, excavation, and backfilling work associated with the sub-grade piping installation.

GES will locate utility lines prior to construction via Pennsylvania One Call utility clearance and through Quebecor facility utility plans. GES and all subcontractors will exercise caution and schedule operations in advance to ensure that normal business activities at the facility will not be disrupted. Construction will be completed in phases to provide the least possible interference to Quebecor activities. GES will coordinate an orderly transfer of personnel and equipment to the facility.

3.6 REMEDIATION SYSTEM RECOVERY WELL INSTALLATION

A total of 18 new recovery wells will be installed to provide an aggressive recovery well network for HVTPE in the Railroad Siding and Line Leak Areas; seven existing wells will also be used. Two groundwater recovery sumps (RS-1 and RS-2) will be installed in the two existing Tank Field locations following UST removal and Tank Field backfilling activities. The HVTPE recovery wells will be constructed of 4"-diameter schedule 40 polyvinyl chloride (PVC) piping for well casing and 4"-diameter schedule 40 PVC piping with 0.02-inch slots for well screen. The proposed locations for the new HVTPE recovery wells and tank field groundwater recovery sumps are shown on the site plan **(Figure 3-1)**.

Borehole advancement will be performed using a truck-mounted drill rig with an air-rotary methodology. Soil samples will be continuously cored from each boring using a split-spoon sampling device. Soil samples will be screened for VOCs with a hand-held organic vapor monitor (OVM). One soil sample will be collected from each of the soil borings for analysis of toluene, ethylbenzene, and xylenes (TEX) by EPA method 8020A. Additional sampling details can be found in the Sampling and Analysis Plan.

Table 3.1 summarizes the existing wells that will be utilized as recovery wells and the new recovery wells that will be installed

Table 3.1
Summary of HVTPE Recovery Wells and Groundwater Recovery Sumps and Monitoring Wells

	Tank Field Area	Railroad Siding Area	Line Leak Area
Existing wells/sumps to be utilized	MW-3A (monitoring well only)	MW-10, RW-2, RW-3, RW-4, S-3, and S-4	MW-21A
New recovery wells/ sumps to be installed	RS-1, RS-2	RW-5, RW-6, RW-7, RW-8, RW-9, RW-10, RW-11, RW-12, and RW-13	RW-14, RW-15, RW-16, RW-17, RW-18, RW-19, RW-20, RW-21, RW-22,

Tan Excavation activities in the Tank Field Area are expected to destroy three POC monitoring wells, MW-3, MW-4, and RW-1. In order to replace these wells, three new POC wells, MW-3A, RS-1, and RS-2 will be installed in the Tank Field Area.

4.0 PROPOSED FIELD TASKS

Most necessary field data was collected during previous phases of the site investigation. GES will utilize the field studies and pilot tests completed during the RCRA Facilities Investigation (RFI) and the Corrective Measures Study (CMS). These include pump and slug tests (reported in the RFI), soil vapor extraction pilot tests and bioremediation tests (reported in the CMI) and hydrologic parameters derived from historical operation of the existing groundwater extraction and treatment system (reported in the RFI and all historical quarterly site-summary reports). This existing data base is sufficient to provide data for site-specific design criteria such as extraction point spacing, groundwater and vacuum pump sizing, vapor extraction system design, and treatment system design for extracted soil vapors and groundwater.

The one area lacking in the historical data is a definition of specific concentrations of chemicals of concern in soils surrounding and beneath the existing USTs. In order to obtain this data, required for the CMI design, GES will initiate a soil-sampling program in the vicinity of the Tank Field Area for the following purposes:

1. Define and sample the soil strata determined to exhibit the highest concentrations of chemicals of concern - these sample results will be utilized to gain preclassification of soils for the purpose of hazardous waste disposal (i.e., soils excavated during tank excavation); and

2. Determine soil quality at depth-discrete intervals, specifically focusing on the strata below a continuous concrete slab located beneath each of the two UST fields.

Details of the data collection programs proposed to complete these needs are detailed in the following two subsections.

4.1 Preclassification of Soil for Disposal Purposes

Pre-characterization soil sample locations have been identified by targeting areas anticipated to indicate the highest degree of impact. These locations were identified from historical information on solvent releases and from information gathered during a soil boring program completed during the CMS. A summary of data collected during the soil boring program is shown on **Figure 4-1**. Based on the information, eight soil boring locations were identified; the locations were selected based on the physical site constraints, assumed groundwater flow direction, and the distribution of chemicals of concern in existing monitoring wells surrounding the tank field. The proposed locations are shown on **Figure 4-2**.

A truck-mounted air rotary/hollow-stem auger drill rig capable of collecting discreet-depth split spoon samples will advance the soil borings. Each of the proposed borings will be advanced to approximately 14 feet below grade; samples will be collected in two-foot intervals, beginning at four feet below grade. All recovered soil samples will be logged and immediately placed in clean, laboratory-issued sample bottles. Soil sample procedures will be conducted in accordance with the Sampling and Analysis Plan.

An organic vapor monitor (OVM) will be used to determine the relative concentration of volatile organics in each sample. The sample with the highest OVM concentration per boring location will be retained for laboratory analysis for the required hazardous waste disposal parameters. Disposal parameters will be identified by the yet-to-be-determined disposal facility.

During soil sampling, all drilling and sampling devices will be decontaminated prior to use and between sample locations; decontamination methods will follow the decontamination procedures stated in the Sampling and Analysis Plan.

After receipt of analytical results, GES will contact applicable waste disposal companies to gain written pre-approval for impacted soil disposal. Via this process, GES avoids staging hazardous material at the Quebecor facility.

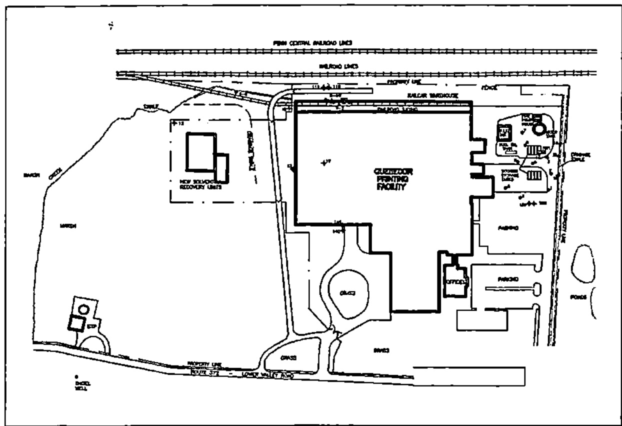
4.2 Determination of Soil Quality Beneath the USTs

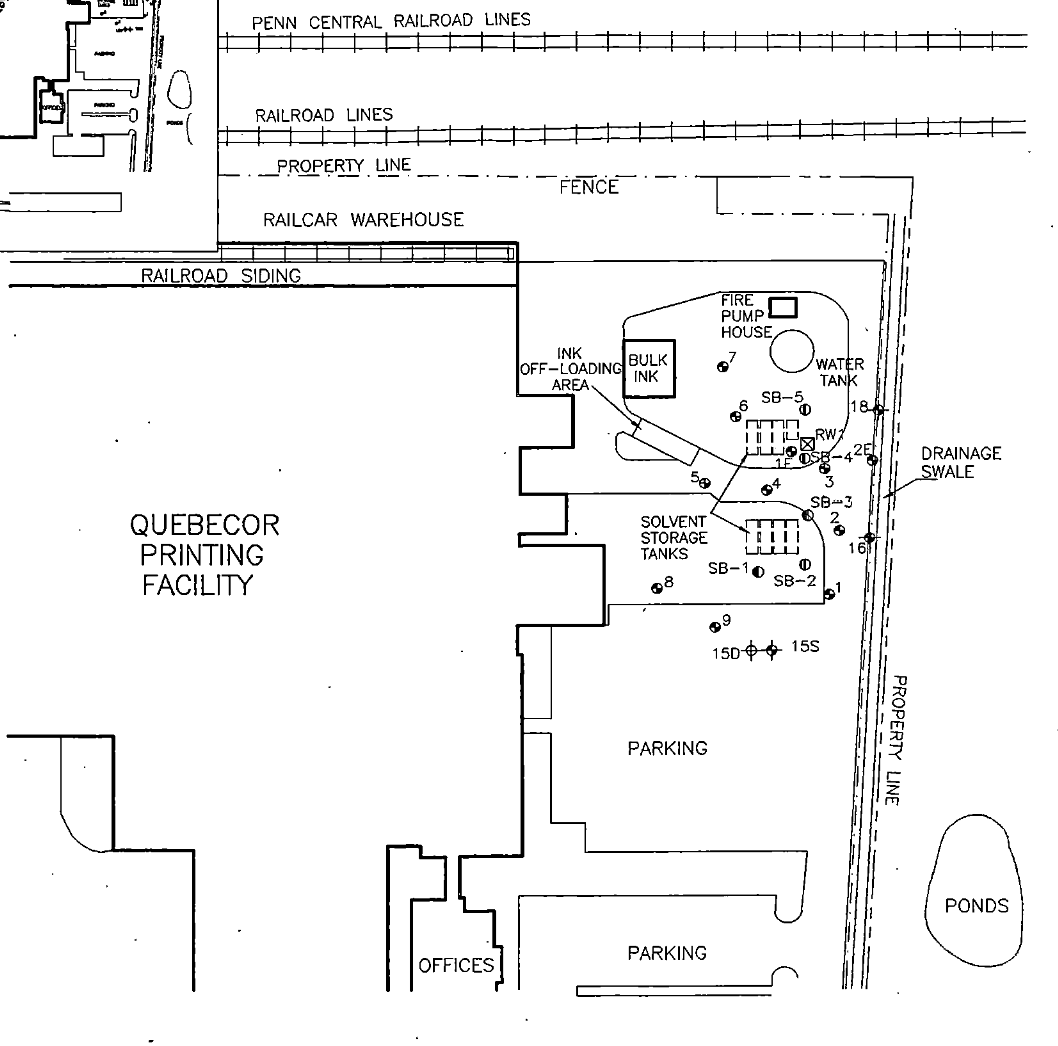
During the first week of March 1998, Quebecor located as-built drawings for the existing facility Tank Fields. Prior to location of the drawings, Quebecor and GES were unaware of the UST construction details. Most notably, the information on the as-built drawings shows that the USTs are located on and anchored to a continuous, 30 foot by 40 foot by 1-foot thick reinforced concrete slab (one slab per tank field). Per the drawings, the concrete slabs are shown to extend to 11.5 feet below grade.

Based on this information, GES proposes to leave the concrete slab in place following removal of underground storage tanks. GES is aware that this slab will limit the collection of any soil samples from *directly* beneath the USTs.

However, since GES is aware of the need to provide some delineation of soil quality at depths greater than the bottom of the slab, GES proposes to collect eight soil samples from approximately 12 feet to 14 feet below grade, concurrent with the soil pre-classification sampling (Subsection 4.2). The samples would be collected as close to the edge of the USTs as possible (and as close to the concrete slabs) without risking damage to the in-place tanks. However, no attempts would be made to penetrate the slabs. The 12 to 14 foot samples would be for the specific purpose of assessing soil quality beneath the depth of the concrete slab; laboratory analysis would be completed for BTEX via EPA Method 8020. Proposed locations of the samples are shown on **Figure 4-2**.

Should soil samples collected in the 12 to 14 foot range contain concentrations of Chemicals of Concern greater than the Soil Cleanup Standards, provisions for including a soil remediation system in the tank field area may be required.





BORING NUMBER	OVM READINGS	LAB RESULTS
SB-1	4' – 0 5' – 0 7' – 1.7 7.5' – 1.9 8.5' – 2.5	FOR 7'-9' B – ND T – 9.7 E – ND X – ND

BORING NUMBER	OVM READINGS
SB-2	5' – 0.8 9' – 1.5 10' – 1.9 11' – 1.1

BORING NUMBER	OVM READINGS
SB-3	3' – 1.7 5' – 0.8 6' – 0.3 7' – 0.2 8' – 0.7

BORING NUMBER	OVM READINGS	LAB RESULTS
SB-4	5' – 15.5 7.5' – 888 8.5' – 176 9' – 225 10' – 215 11' – 76 12' – 115 13' – 2	FOR 5'-7' B – ND T – 15,000 E – 380 X – 1,800

BORING NUMBER	OVM READINGS	LAB RESULTS
SB-5	4' – 1.5 6' – 2.0 8' – 275 8.5' – 687 11.5' – 125 12.5' – 225 13' – 50	FOR 11'-13' B – ND T – 2,100 E – 77 X – 510

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

LEGEND

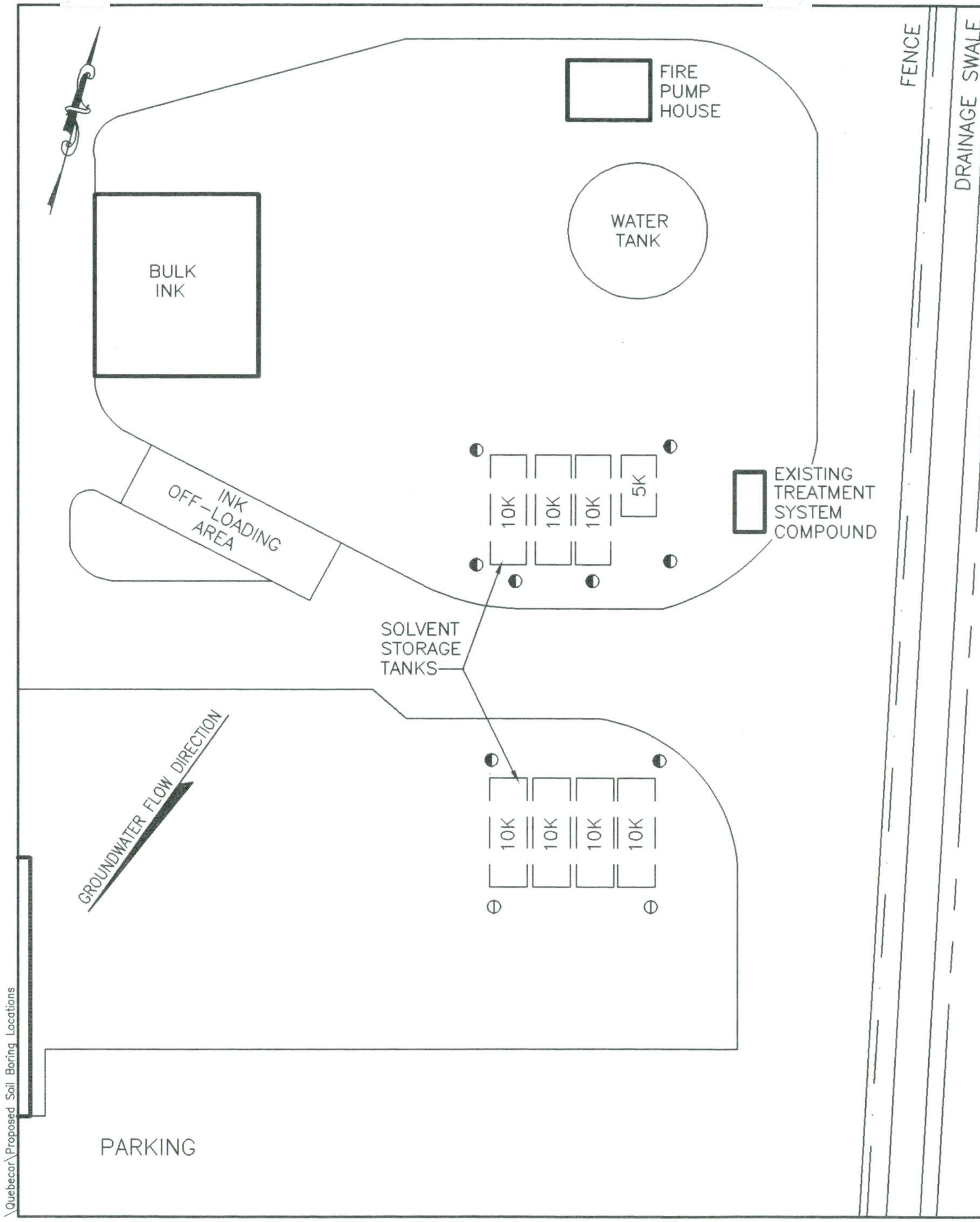
- MONITORING WELL
- RECOVERY WELL
- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- SOIL BORING LOCATION
- B BENZENE
- T TOLUENE
- E ETHYLBENZENE
- X XYLENE
- ND NOT DETECTED

NOTES:
- ALL LAB RESULTS IN MICROGRAMS PER KILOGRAM (ug/kg)
- NO SAMPLES WERE ANALYZED FROM SB-2 AND SB-3
- OVM READINGS ARE UNITLESS

SOIL BORING LOCATIONS SHOWING OVM READINGS AND LABORATORY ANALYTICAL RESULTS 13 MAY 1994

QUEBECOR PRINTING ATGLEN INC. ATGLEN, PENNSYLVANIA

NORTH	SCALE IN FEET	DATE	SOURCE
	0 50 100	9-24-93	B
		DWG # PS0046B	FIGURE 4-1



LEGEND

◐ PROPOSED SOIL BORING LOCATIONS FOR WASTE CLASSIFICATION SAMPLES AND SOIL QUALITY SAMPLES

⦶ PROPOSED SOIL BORING LOCATIONS FOR SOIL QUALITY SAMPLES ONLY

NOTE:
ALL SOIL BORINGS TO BE INSTALLED TO 14' BELOW GRADE.

PROJECT NO: 0010 0050	PROPOSED SOIL BORING LOCATIONS
DESIGNED BY:	QUEBECOR PRINTING ATGLEN INC. ATGLEN, PENNSYLVANIA
DRAWN BY: GPL	
CHECKED BY: MS	GES GROUNDWATER & ENVIRONMENTAL SERVICES, INC. 410 EAGLEVIEW BLVD., SUITE 110 EXTON PENNSYLVANIA 19431
APPROVED BY: KS	
SCALE: 0 40	DATE: 4-21-98 DRAWING NO: FIGURE 4-2

\Quebecor\Proposed Soil Boring Locations

5.0 WELL INSTALLATION AND DEVELOPMENT

A total of 18 new recovery wells will be installed to provide an aggressive recovery well network for HVTPE in the railroad siding and line leak areas. One new monitoring well will also be installed in the Tank Field Area to be used as a compliance monitoring point. All wells will be installed using a truck-mounted drill rig with an air-rotary methodology and/or hollow-stem auger capability. Soil samples will be continuously collected from each boring using a split-spoon sampling device. All recovered soil samples will be screened for VOCs with a hand-held organic vapor monitor (OVM). The soil sample exhibiting the highest OVM reading will be retained from each of the soil borings for laboratory analysis of toluene, ethylbenzene, and xylenes (TEX) by EPA Method 8020. Table 3.5 summarizes new well installation. Specifics of well installation are listed below.

5.1 Tank Field Area

Two groundwater recovery sumps (RS-1 and RS-2) will be installed in the two existing tank field locations following UST removal and tank field backfilling activities (**Figure 3-2**). The wells will be installed to a total depth of 15 feet below grade and will be constructed of 5 feet of solid 6" diameter schedule 40 polyvinyl chloride (PVC) riser followed by ten feet of 6-inch diameter schedule 40 PVC well screen with 0.020-inch slots. Also, a 4-inch diameter groundwater monitoring well (designated MW-4A) will be installed in the approximately location of well MW-4. It is anticipated MW-4 will be destroyed during UST removal activities. Well construction details and drawings are provided in the 50% Design Report.

5.2 Line Leak Area

Nine new HVTPE recovery wells will be installed in the line leak area. All wells will be constructed of 4"-diameter schedule 40 PVC piping for well casing and 4- inch diameter schedule 40 PVC piping with 0.02-inch slots for well screen. The HVTPE recovery wells will be installed to a depth of approximately 15 feet. The well screen for each well will extend from five to fifteen feet below grade. The proposed locations for the new HVTPE recovery wells are shown on **Figure 3-1 and 3-2**.

5.3 Railroad Siding Area

Nine new HVTPE recovery wells also will be installed in the line leak area. All wells will be constructed of 4"-diameter schedule 40 PVC piping for well casing and 4-inch diameter schedule 40 PVC piping with 0.02-inch slots for well screen. The HVTPE recovery wells will be installed to a depth of approximately 15 feet. The well screen for each well will extend from five to fifteen feet below grade. The proposed locations for the new HVTPE recovery wells are shown on **Figure 3-1 and 3-2**.

5.4 Well Development

5.4.1 Training Qualifications

All field personnel involved in well development shall have completed, as a minimum, OSHA 40 HOUR HAZWOPER training and an annual 8-hour OSHA Health & Safety Training refresher course. All personnel will be familiar with and will have signed the Quebecor Site Specific Health and Safety Plans. All personnel will adhere to aforementioned plans.

All field personnel involved with well development at this facility will have already performed a minimum of three well development events under the direct supervision of experienced personnel. Field personnel will also have experience in pump operation and equipment decontamination procedures.

5.4.2 Materials and Equipment Necessary for Task Completion

The following equipment will be available during well development:

- Electronic product/water interface probe,
- Jet pump,
- Polyethylene hose and fittings,
- Generator (if onsite power is not available),
- Five-gallon bucket and watch or stopwatch (to determine discharge rate during development),
- Decontamination supplies,
- 350-gallon Nalgene tank to containerize purge water,
- Containers for decontamination,
- Scrub brush,
- Sorbent pads or paper towels,
- Air monitoring equipment (OVM will be utilized),
- Well opening tools, and
- Extra caps and locks.

5.4.3 Health and Safety Requirements

All field personnel must review and sign the Site Specific HASP. Ambient air monitoring will be performed upon opening each well to be developed to determine the necessity of PPE upgrade. As a minimum, level "D" attire will be worn.

5.4.4 Decontamination Requirements

To eliminate the possibility of cross contamination, clean, unused polyethylene piping will be dedicated to each well. Standard decontamination procedures for the optical interface probes between wells will be performed according to the following schedule:

- Initial rinse with clean tap water to remove excess residuals.
- Scrub equipment with sponge or clean, soft cloth in a distilled water/Liquinox® (or equivalent non-phosphate detergent) solution.
- Double rinse with deionized/distilled water.

5.4.5 Well Development Methodology

The well development process is performed to remove drilling-related fluids and sediment from the well bore and filter pack, thus optimizing well yield and the procurement of representative groundwater samples.

A two-fold development method will be utilized to adequately develop wells. The initial development process will consist of mechanically surging the well to dislodge particles from the well screen and pack. Subsequent to surging, the well will be thoroughly purged to extract sediment-laden fluids. This surge-and-purge development process, which is particularly useful in eliminating fine-grained materials from well bores, will be repeated until the discharge is noted to be qualitatively sediment-free.

All fluids pumped from the wells will be discharged directly into a 350-gallon Nalgene storage tank located in the bed of a pick-up truck. Once the tank is full, all the recovered fluids will be transported to the onsite groundwater remediation system, pumped into the system for treatment then discharged to surface water.

5.4.6 Documentation

All site activities will be detailed in the site investigator's field book. The entry shall include (as a minimum) the date, time, weather, project name and number, persons present on-site, task description, pertinent Health and Safety information, and all measured parameters. Only relevant observations should be recorded, including discharge water flow rates, cloudiness and odor.

Table 5-1
Summary of HVTPE Recovery Wells, Groundwater Recovery Sumps, and Monitoring Wells

	Tank Field Area	Railroad Siding Area	Line Leak Area
Existing wells/sumps to be utilized	MW-3A (Monitoring well only)	MW-10, RW-2, RW-3, RW-4, S-3, and S-4	MW-21A
New recovery wells/ sumps to be installed	RS-1, RS-2	RW-5, RW-6, RW-7, RW-8, RW-9, RW-10, RW-11, RW-12, and RW-13	RW-14, RW-15, RW-16, RW-17, RW-18, RW-19, RW-20, RW-21, RW-22,

6.0 DISCHARGE OF TREATED GROUNDWATER

6.1 Introduction

Quebecor currently operates a groundwater treatment system at this facility and discharges treated groundwater per the stipulations of Industrial Waste NPDES Permit No. PA0054933, obtained by Quebecor in 1987. The existing groundwater treatment system has operated continuously under the conditions of the permit since 1988. On 9 June 1995, Pennsylvania Department of Environmental Resources (Northeast Regional Office) renewed the permit through 9 June 2000. A copy of the existing permit is included as **Appendix D**.

6.2 Current Permit Stipulations/System Requirements

The NPDES permit requires analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) via EPA Analytical Method 602 as well as monthly reporting of system effluent analytical results, discharge rates and effluent pH. In compliance with these requirements, the existing groundwater treatment system is currently sampled monthly, as it has been for the last ten years. The system operation is checked three times daily (once per work shift) by Quebecor Personnel and system checks and adjustments are made weekly by GES personnel in order to maintain optimum system performance. These procedures allow for any system inconsistencies to be addressed in a short span of time. In addition, the installation of granular activated carbon treatment to the system effluent provides additional safeguards to maintain water discharge quality.

Since the initial operation of this system, discharge has been maintained at approximately one gallon per minute. All effluent water is discharged to an onsite storm water catch basin and is then routed to an unnamed tributary of Valley Creek.

6.3 Proposed Discharge

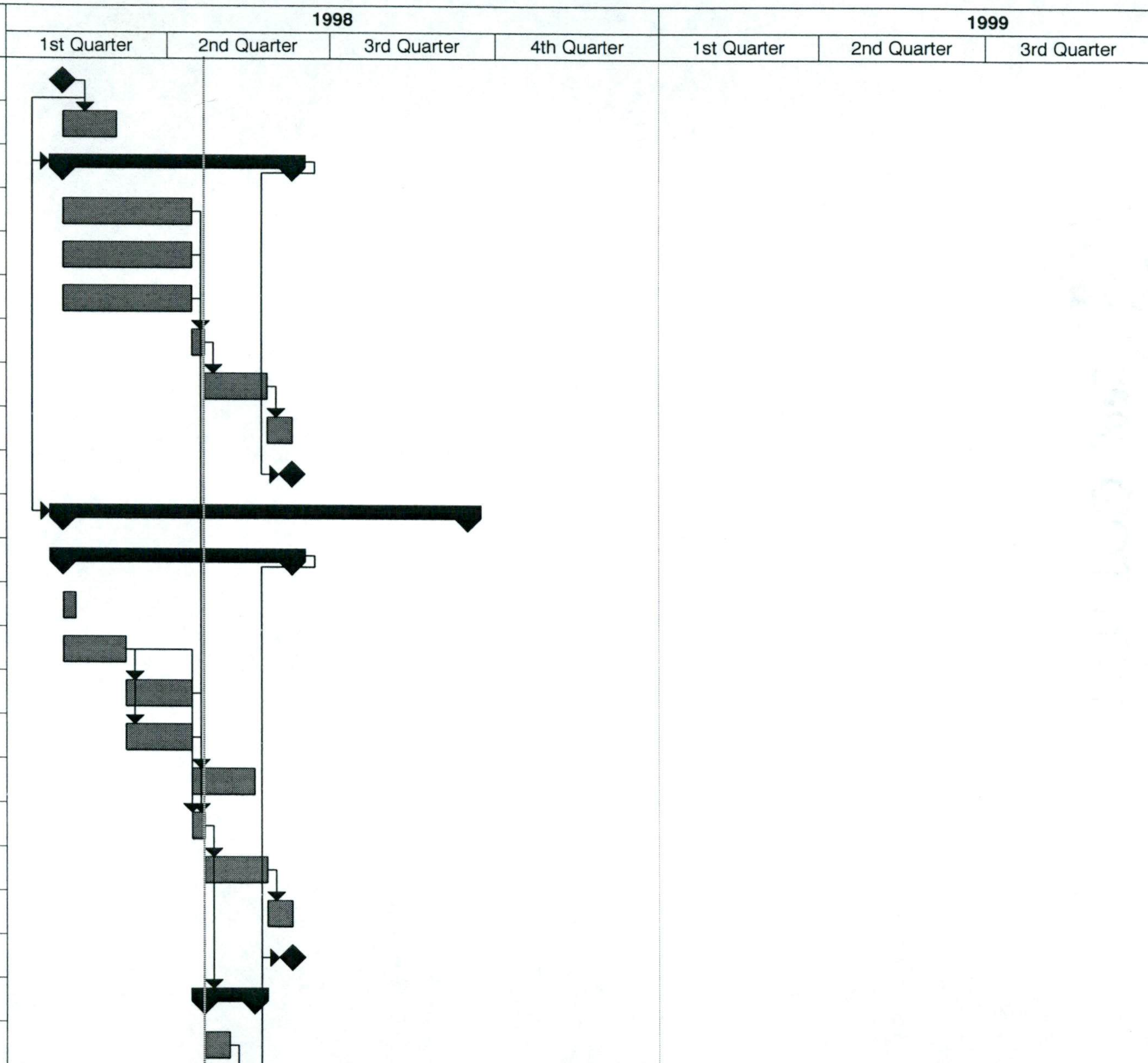
Upon agreement by EPA, Quebecor, and GES of the 50% Design package, GES will submit a request for modification of the existing permit. GES anticipates that only a request for a change in discharge rate will be sought: the current average daily flow if the system is 1,440 gallons per day (GPD) and the estimated daily discharge for the Correctives Measures remediation system is 15,000 gpd.

7.0 PROJECT SCHEDULE

Figure 7.1 represents the current projections for completion of specific tasks and phases of the Corrective Measures Implementation.

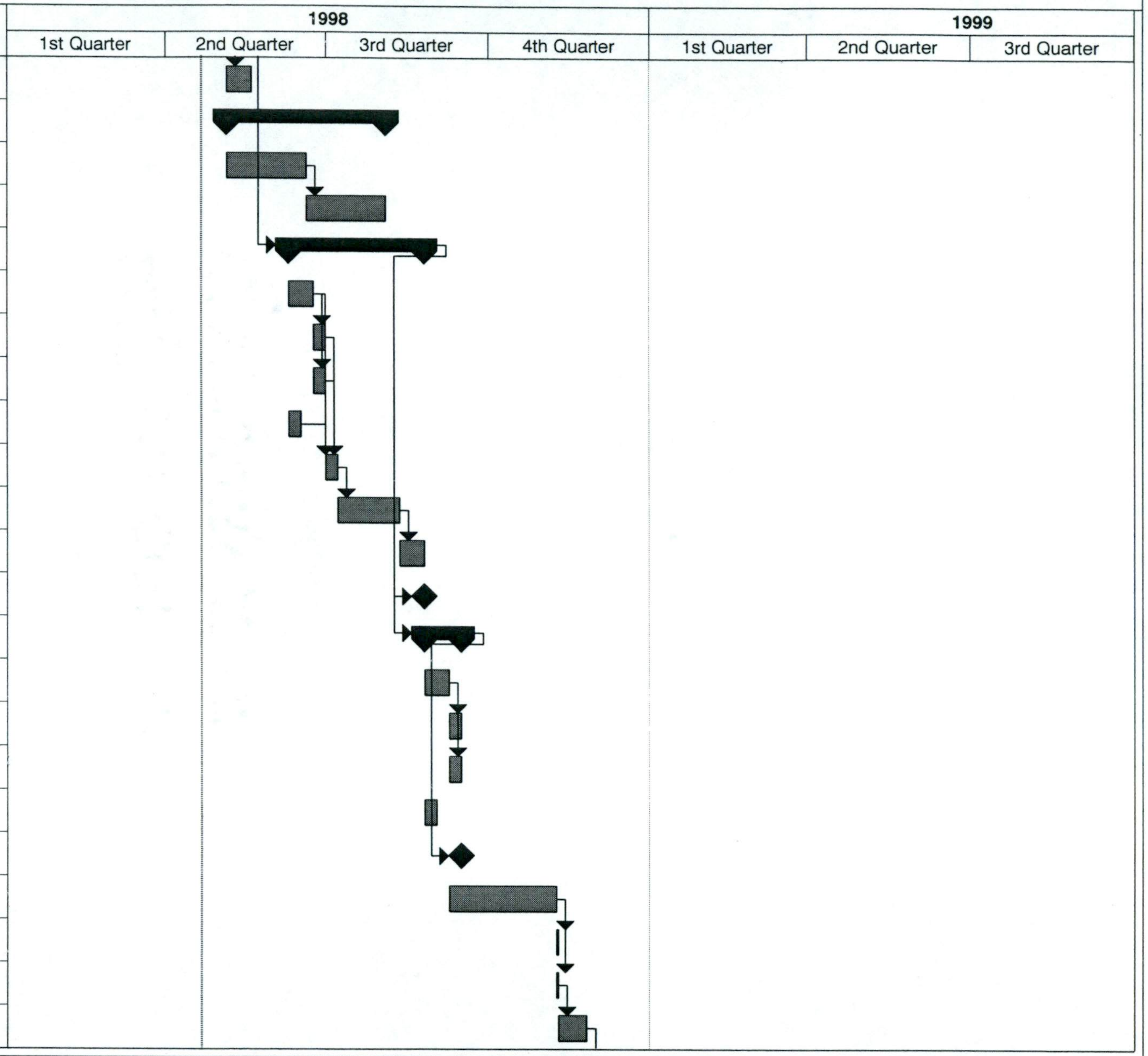
QUEBECOR PRINTING ATGLEN, INC.
CORRECTIVE MEASURES IMPLEMENTATION

ID	Task Name
1	FINAL CONSENT ORDER - CONTRACT AWARD
2	30 DAY PUBLIC COMMENT
3	DRAFT CMI WORK PLAN
4	PROGRAM MANAGEMENT PLAN
5	SAMPLING & ANALYSIS PLAN
6	COMMUNITY RELATIONS PLAN
7	CLIENT AND LEGAL REVIEW PERIOD
8	EPA REVIEW PERIOD
9	REVISED DRAFT CMI WORK PLAN
10	COMPLETE WORK PLAN PHASE
11	CORRECTIVE MEASURE DESIGN
12	50% PRELIMINARY DESIGN
13	HEALTH AND SAFETY PLAN
14	PLANS & SPECIFICATIONS
15	COST ESTIMATE
16	OPERATION AND MAINTENANCE PLAN
17	SAMPLING & ANALYSIS PLAN REVISION
18	50% DESIGN CLIENT REVIEW PERIOD
19	EPA REVIEW PERIOD
20	REVISED 50% DESIGN
21	COMPLETE 50% DESIGN
22	WASTE PRECLASSIFICATION
23	SAMPLE COLLECTION/ANALYSIS



QUEBECOR PRINTING ATGLEN, INC.
CORRECTIVE MEASURES IMPLEMENTATION

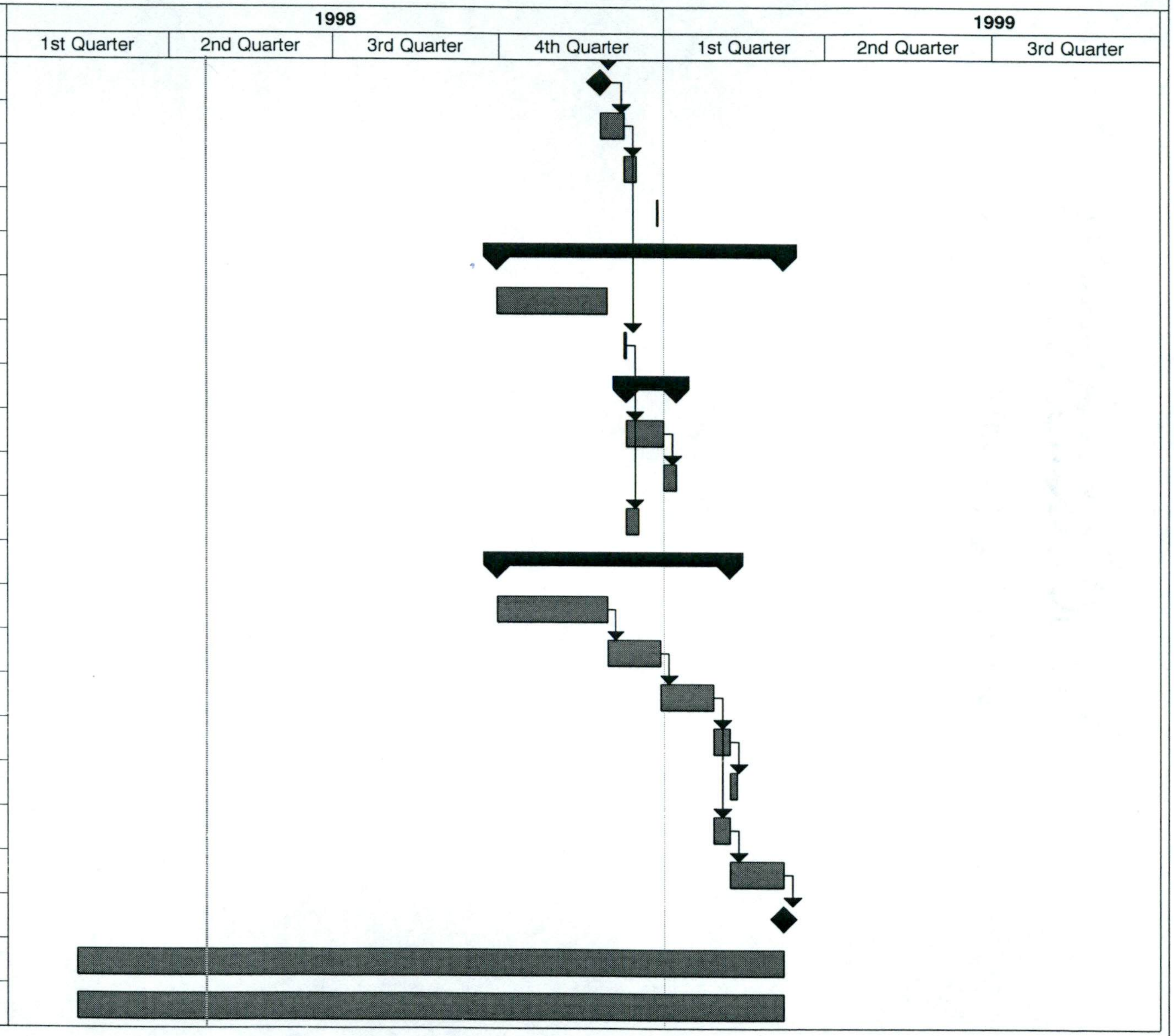
ID	Task Name
24	OBTAIN WASTE DISPOSAL APPROVALS
25	**PERMITTING (AIR, NPDES)**
26	PERMIT APPLICATION
27	PERMIT APPROVAL
28	90% DRAFT FINAL DESIGN
29	PLANS & SPECIFICATIONS
30	COST ESTIMATE
31	OPERATION AND MAINTENANCE PLAN
32	SAMPLING & ANALYSIS PLAN
33	90 % DESIGN CLIENT REVIEW PERIOD
34	EPA REVIEW PERIOD
35	REVISED 90% DESIGN
36	COMPLETE 90% DESIGN
37	100% FINAL DESIGN
38	PLANS & SPECIFICATIONS
39	COST ESTIMATE
40	OPERATION AND MAINTENANCE PLAN
41	SAMPLING & ANALYSIS PLAN
42	**COMPLETE 100% DESIGN**
43	**TANK REMOVAL PREPARATION/PROCUREMENT**
44	**PRECONSTRUCTION MEETING - UST REMOVAL**
45	**SUBSURFACE UTILITY SURVEY**
46	**UST REMOVAL ACTIVITIES**



this a change order —

QUEBECOR PRINTING ATGLEN, INC.
CORRECTIVE MEASURES IMPLEMENTATION

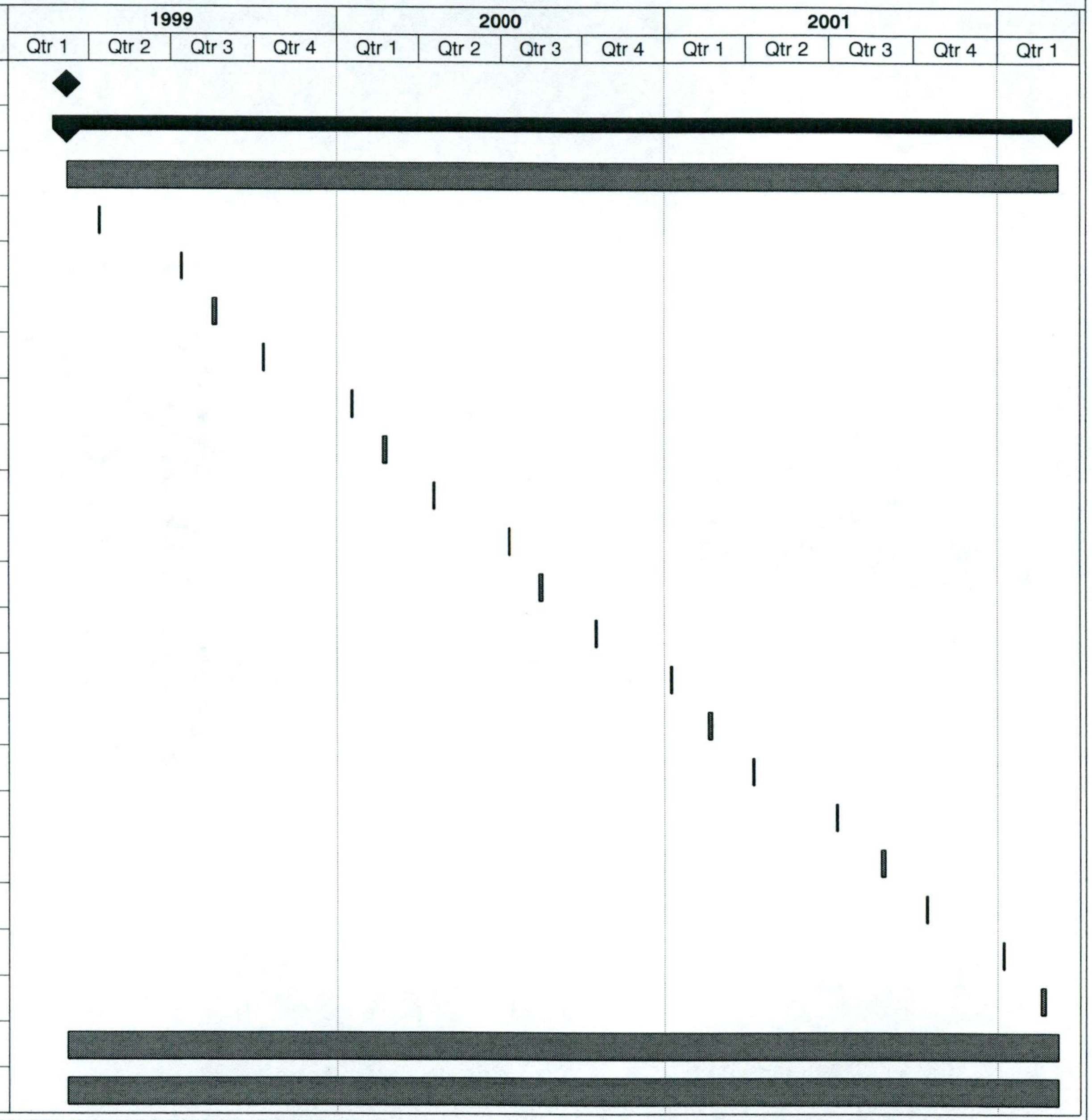
ID	Task Name
47	UST REMOVAL COMPLETE
48	INSTALL NEW RECOVERY WELLS & SUMPS
49	INSTALL INTERIM PUMPING SYSTEM
50	SUBMIT PADEP UST CLOSURE REPORT
51	CORRECTIVE MEASURES CONSTRUCTION
52	SUBCONTRACTOR PROCUREMENT
53	PRECONSTRUCT INSPECTION MTG.
54	TRENCHING/CONSTRUCTION
55	TRENCHING/PIPE INSTALLATION
56	RESTORATION/REPAVING
57	COMPOUND SETTING
58	REMEDIATION SYSTEM INSTALLATION
59	EQUIPMENT PROCUREMENT
60	INSTALL EQUIP. IN CONTAINERS
61	INSTALL CONTAINERS AT SITE
62	ELECTRICAL SERVICE INSTALLATION
63	SITE SURVEY
64	SYSTEM START-UP
65	PREPARE/SUBMIT AWI REPORT
66	COMPLETE CONSTRUCTION PHASE
67	COORDINATION WITH EPA
68	CLIENT COORDINATION/STATUS REPORT SUBMITTAL



GES

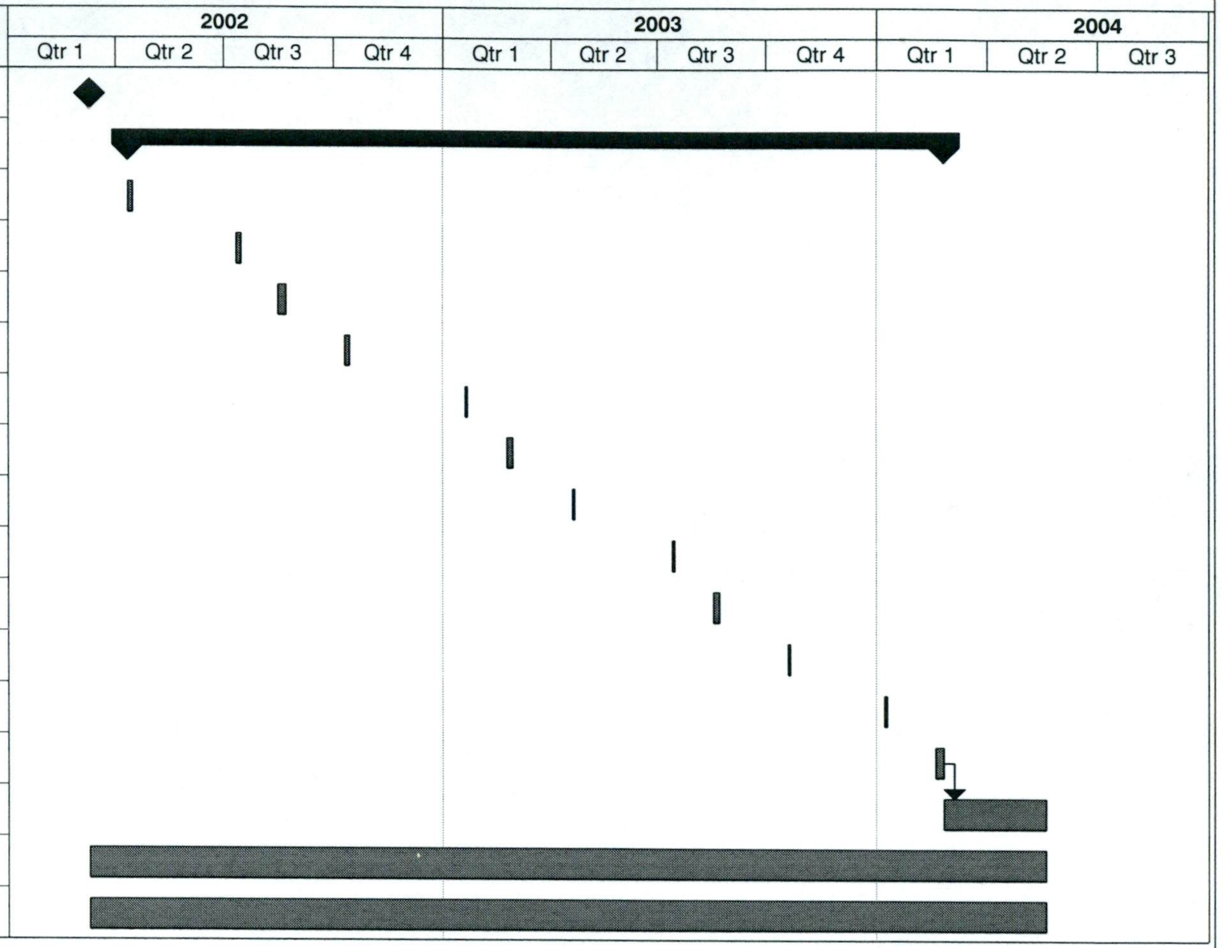
QUEBECOR PRINTING ATGLEN INC.
CORRECTIVE MEASURES SYSTEM OPERATION AND MAINTENANCE PERIOD

ID	Task Name
1	**SYSTEM START-UP**
2	**SYSTEM OPERATIONAL PERIOD - 3 YEARS**
3	SYSTEM O&M
4	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
5	BIANNUAL EXPANDED COMPLIANCE SAMPLING (18 WELLS)
6	SEMI-ANNUAL REPORT
7	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
8	BIANNUAL EXPANDED COMPLIANCE SAMPLING (18 WELLS)
9	SEMI-ANNUAL REPORT
10	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
11	BIANNUAL EXPANDED COMPLIANCE SAMPLING (18 WELLS)
12	SEMI-ANNUAL REPORT
13	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
14	BIANNUAL EXPANDED COMPLIANCE SAMPLING (18 WELLS)
15	SEMI-ANNUAL REPORT
16	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
17	BIANNUAL EXPANDED COMPLIANCE SAMPLING (18 WELLS)
18	SEMI-ANNUAL REPORT
19	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
20	BIANNUAL EXPANDED COMPLIANCE SAMPLING (18 WELLS)
21	SEMI-ANNUAL REPORT
22	**COORDINATION WITH EPA**
23	**CLIENT COORDINATION**



QUEBECOR PRINTING ATGLEN INC.
CORRECTIVE MEASURES POST-SYSTEM OPERATION PERIOD

ID	Task Name
1	**SYSTEM DEACTIVATED**
2	**SYSTEM POST-OPERATIONAL PERIOD - 2 YEARS**
3	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
4	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
5	SEMI-ANNUAL REPORT
6	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
7	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
8	SEMI-ANNUAL REPORT
9	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
10	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
11	SEMI-ANNUAL REPORT
12	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
13	QUARTERLY COMPLIANCE SAMPLING (10 WELLS)
14	SEMI-ANNUAL REPORT
15	**CLOSURE NEGOTIATIONS**
16	**COORDINATION WITH EPA**
17	**CLIENT COORDINATION**



8.0 COMMUNITY RELATIONS PLAN

8.1 Overview

The primary objective of the community relations program at the Quebecor facility is to provide access to accurate information on the status of the Corrective Measures Implementation Program to all interested parties. To accomplish this, the following techniques will be utilized to maintain a reliable, up to date information base, and provide methods for dissemination of such information to the public.

8.2 Information Contact

Groundwater & Environmental Services, Inc. will not provide any information about this project to the general public, any news media service. GES will also only answer general, project related questions if contacted by Pennsylvania Department of Environmental Protection (PADEP) United States Environmental Protection Agency (USEPA) officials.

Any persons requesting project related information, status or purpose should contact the Quebecor Environmental Services Coordinator, directly. The contact information is as follows:

Diane E. Potts
Environmental Services Coordinator
QUEBECOR PRINTING ATGLEN INC.
4581 Lower Valley Road
Atglen, PA 19310-0465

Phone: (610) 593-0495

Any written requests for information received by GES will immediately be forwarded to Diane Potts.

Designating one person from the Quebecor Staff to be responsible for providing all information is intended to assist in disseminating accurate, consistent information to all parties.

Public information on this project is also on record and available for review on Monday through Friday, from 9:00 AM to 5:00 PM, by contacting the EPA. The contact information is as follows:

Ms. Maureen Essenthier
Project Coordinator
U.S. Environmental Protection Agency (3HW80)
841 Chestnut Building
Philadelphia, Pennsylvania 19107

Phone : (215) 566-3416

8.3 Update Information Repository

The Quebecor Environmental Services Coordinator is responsible for maintaining a data base on the progress of the Corrective Measures Initiation process. The Environmental Services Coordinator or her designates are also responsible for attending all meetings between Quebecor, USEPA, PADEP and GES to stay appraised of CMI progress. The site Environmental Services Coordinator is also responsible for maintaining a project Fact Sheet, updated biannually, for public distribution on an "as-requested" basis.

8.4 Fact Sheet

Distribution of accurate site information to all immediate neighbors of the site will be distributed bi-annually (twice per year). The same fact sheets shall be posted internally at the Quebecor facility at locations central for all employees to view. Distribution to any other parties will be on an as-requested basis. The concise nature of this fact sheet will be similar to a press release and suitable for use as such.

8.5 Mailing List

All interested parties who desire to receive the fact sheets as they are published may do so by requesting to be put on a mailing list. Formal requests for inclusion on the mailing list should be made to the Quebecor Environmental Services Coordinator, by telephone or letter.